the OIL AND GAS JOURNAL

LOOK OVER YOUR USED DRILL PIPE!

Pick out the serviceable Super Shrink-Grip pipe. You can make it usable again by installing new REED Super Shrink-Grip Tool Joints.

You can beat the pipe shortage—and save money while doing it—by putting new **REED** Super Shrink-Grip Tool Joints on used Super Shrink-Grip drill pipe. Your own crew can do the job. There's no need to ship used pipe hundreds or even thousands of miles to have tool joints applied in a shop.

REED ROLLER BIT COMPANY

HOUSTON 1, TEXAS

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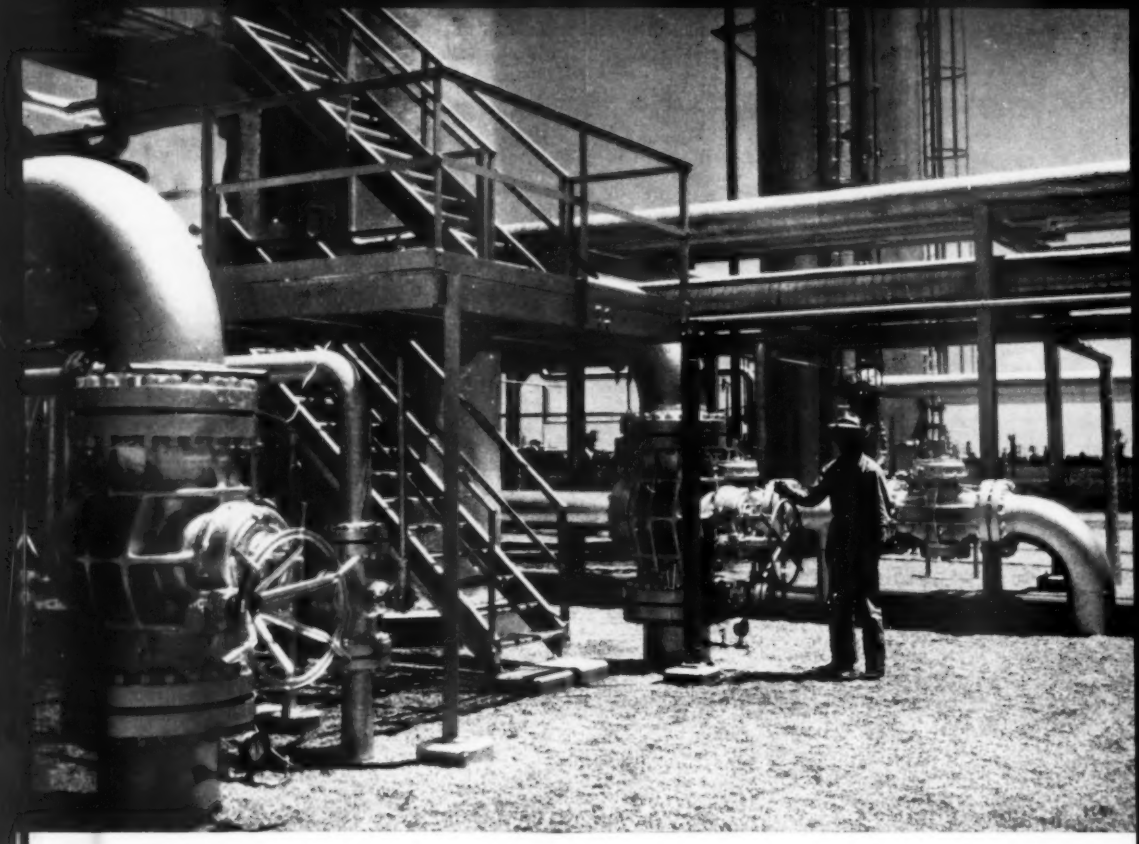
Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

PRICE 50 CENTS TABLE OF CONTENTS PAGE 67 FEBRUARY 11, 1952



In the key spots

REFINERIES AND GASOLINE PLANTS USE NORDSTROMS

Small investment in Nordstrom valves protects costly capital equipment

A valve, in the total cost of a refinery, is an insignificant item.

Yet the failure of one valve can close down a whole process unit. If it leaks, or if it won't operate in an emergency, millions of dollars in capital equipment may be endangered.

So, for more than 30 years, Nordstrom valves have been the overwhelming choice for the tough spots in refinery service – the locations where it simply doesn't pay to take a chance.

Nordstroms often cost no more to buy; almost without exception they are the most economical in the long run. Refineries around the world have proved this to themselves; that's why in plant expansion and modernization programs Nordstroms are specified in an increasing number of key locations.

Rockwell Built

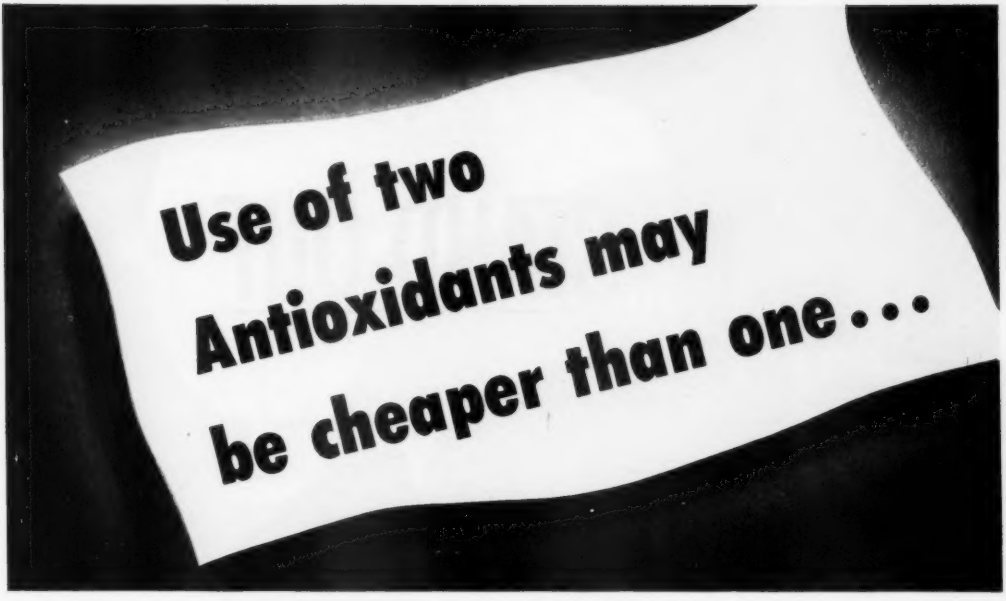
Another ROCKWELL Product

Nordstrom Valves

Lubricant Sealed to Keep Upkeep Down

Rockwell Manufacturing Company

400 N. Lexington Ave., Pittsburgh 8, Pa.



Du Pont District Laboratories may save you money by recommending combinations of antioxidants for certain gasoline stocks

Antioxidant treating results vary with different gasolines. Recognizing this, Du Pont makes two types of antioxidants—Nos. 5 and 22. The question then arises, which is most effective in your particular stocks—depending on your current induction period specifications. Or, might a combination of the two work out best? For an answer to such queries, the nearest Du Pont Petroleum Chemicals Division district laboratory will be glad to evaluate your stocks for antioxidant response. Here is the result of one such investigation . . .

One refiner's gasoline responded more favorably to Du Pont Antioxidant No. 5. Nevertheless, due to an abnormal caustic carry-over in the treating process, Du Pont Antioxidant No. 22 was considered mandatory in this case.

After studying this refiner's treating process and gasoline stocks, the Du Pont district laboratory recommended as a first step that 2 lbs. of Antioxidant No. 22 per 1000 barrels be added as the cracked stream left the cracking unit. This served to protect the stocks prior to and during sweetening.

After doctor treating, the gasoline was further inhibited to a 360 minute induction period with Du Pont Antioxidant No. 5 during the final blending process... *A six-month trial period showed that this method provided a substantial saving for the refiner.*

If you have any antioxidant treating problems, if you have recently changed stocks, or, if you have merely changed your induction period level, the nearest Du Pont district laboratory will be glad to help you determine the most effective means of using antioxidants.

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STAND OUT

..because it stands up!

Check the advantages of Fairbanks-Morse General Purpose Motors and you'll see why they deliver *stand out* performance . . . *stand up* under the heavy starting loads and long period peak capacity operation of oil field service.

Take the exclusive, one-piece Copperspun Rotor for example and note these advantages:

- ★ A truly one-piece indestructible copper rotor winding.
- ★ Withstands higher temperatures: (melting point 2,000° F. for Copper, 1,100° F. for Aluminum).
- ★ High electrical and thermal conductivity.
- ★ Dense, uniform grain structure.
- ★ Separately mounted fans: permitting complete overall machining, better quality control, better dynamic balance.

Then consider the unique one-piece cast frame that protects the motor against falling particles and dripping liquids in *any position* . . . the cross-flow ventilation that assures uniform, cool operating temperatures and the many other advantages your supply store will be happy to demonstrate. Easy to see why Fairbanks-Morse should be your choice for *stand out* motor service. Fairbanks, Morse & Co., Chicago 5, Illinois.

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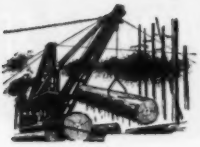
a name worth remembering

OIL FIELD EQUIPMENT • PUMPS • SCALES
ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS



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to order from assures the right rope for your equipment

There is a Macwhyte Wire Rope that has been specially engineered and job-proved for any particular type of equipment you operate. That's why it pays to specify Macwhyte. Over the years, ropes for all types of equipment in every field have been developed by Macwhyte. Recommendations are promptly available either from Macwhyte distributors or Macwhyte Company, 2916 Fourteenth Avenue, Kenosha, Wisconsin.

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"Wire Rope—So What?" (No. 5134)—Illustrated exclusive interview with veteran wire rope engineer who talks straight from the shoulder about saving hundreds of wire rope dollars.

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Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles. Distributors throughout U. S. A. and other countries carry stocks.

1010

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Designed Right! Made Right!

Get MORE from your pumps with these long-lasting valves and seats! They have many exclusive, field-tested features, as shown by this illustration. Both valve and seat are made from high grade alloy steel forgings, precision-machined. They're fully heat treated in our new controlled atmosphere furnace—the most advanced method of heat treating known!

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SOLD THRU SUPPLY STORES EVERYWHERE

160° Standpipe Gooseneck

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Long Sweep Tee

Long Sweep Ell with 2" Outlet

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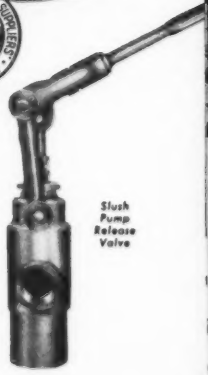
Slush Pump Compounding Valve



Slush Pump Release Valve

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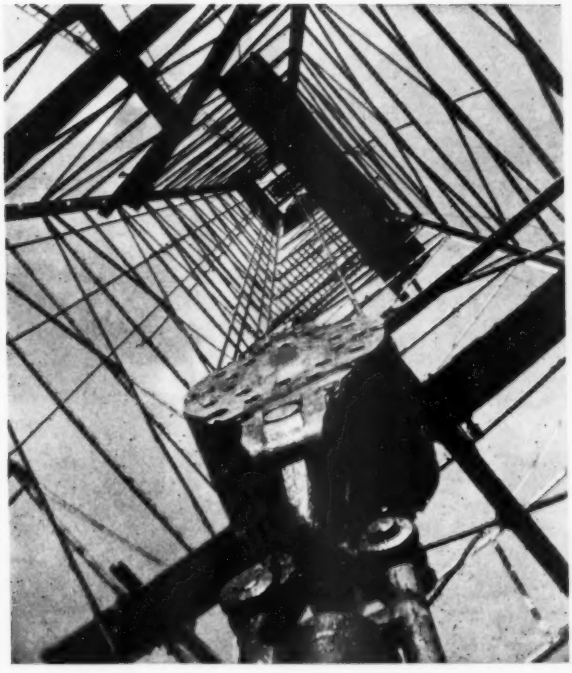
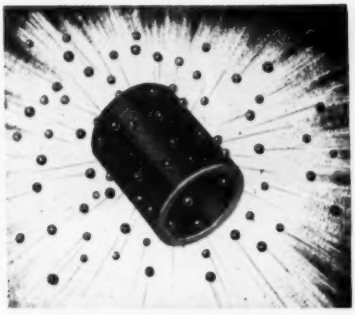
MANUFACTURERS OF DRILLING EQUIPMENT • PRODUCTION EQUIPMENT • FISHING TOOLS PUMP SPECIALTIES

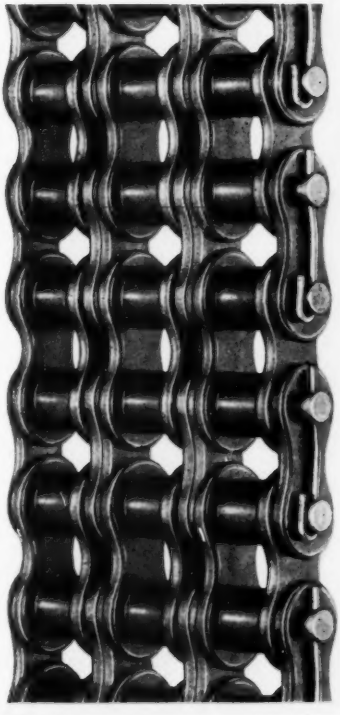
In the Oil Country...

DOWN-TIME HURTS!



Shot-peening hammers extra performance, extra life into Link-Belt Roller Chains





Up comes 15,000 feet of drill pipe at high speed. Sudden stops, sudden starts, rough handling of equipment to get the job done. It's *time* that counts most in the oil country. And, it's *down-time* that hurts. Drilling equipment, in these days of three-mile-deep holes, *must stand the gaff!*

Link-Belt, through 75 years of research, is taking care of your chain problems. Shot-peening of rollers in Link-Belt Precision Steel Roller Chains is *just one* of the ways we're doing it. Thousands of tiny steel balls hammer extra fatigue life into the rollers. You get a longer service life. This and other *extra* Link-Belt features so widely known in the oil fields of the world help repay your chain costs in down-time saved.

Get all the facts from your nearest Link-Belt office.

LINK-BELT

PRECISION STEEL ROLLER CHAIN

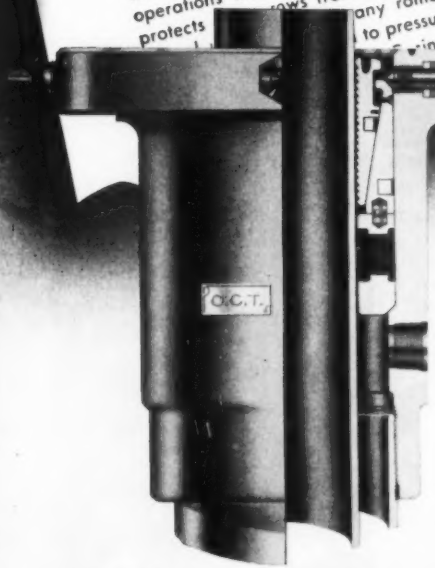
LINK-BELT COMPANY: Indianapolis 6, Dallas 1, Houston 1, Kansas City 8, Mo., Los Angeles 33, New York 7, Toronto 8. Distributors in all fields. 12,033

Easier coupling and uncoupling without sacrificing load distribution

Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain permits easy coupling and uncoupling of multiple width chains—right on the job. Press-fits between chain pins and middle bars have been modified, but full load-carrying capacity across entire width of chain has been maintained.

The Oil and Gas Journal, published Mondays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly. Copyright 1952.

...But
to make a long story
SHORT



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is the only casing
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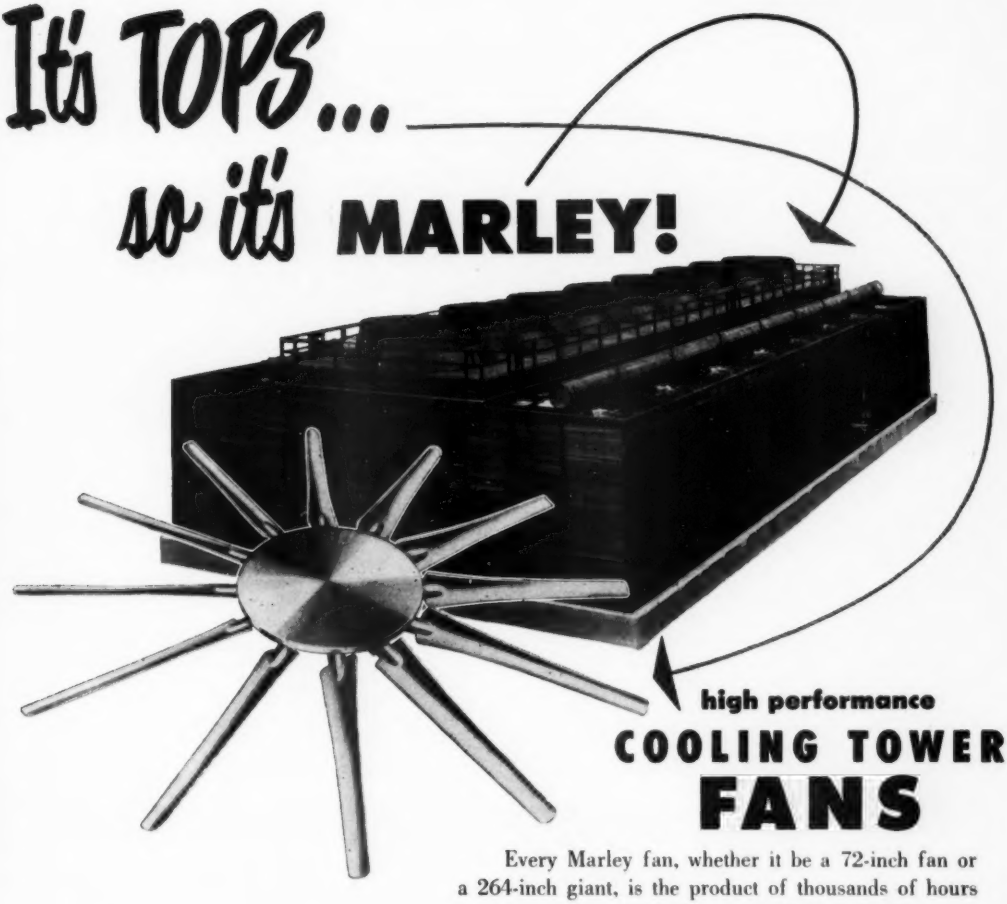
It's TOPS... so it's MARLEY!



high performance

COOLING TOWER FANS

Every Marley fan, whether it be a 72-inch fan or a 264-inch giant, is the product of thousands of hours of Marley research and development.

On the drawing board it is checked and rechecked for engineering exactness. Then begins the long process of testing—first as a scale model, then on to a production model and hundreds of hours in Marley's outdoor laboratory. Here engineering specialists, assisted by finest electronic analysis equipment, check and record its performance under actual operating conditions.

Once approved for production the vigil does not cease. Every step from pattern making to field installation is rigidly controlled and inspected. All machine processes in the Marley fan department are inspected by trained experts and any error means rejection. Final balancing that means smoothness of operation is done by men with years of training and experience.

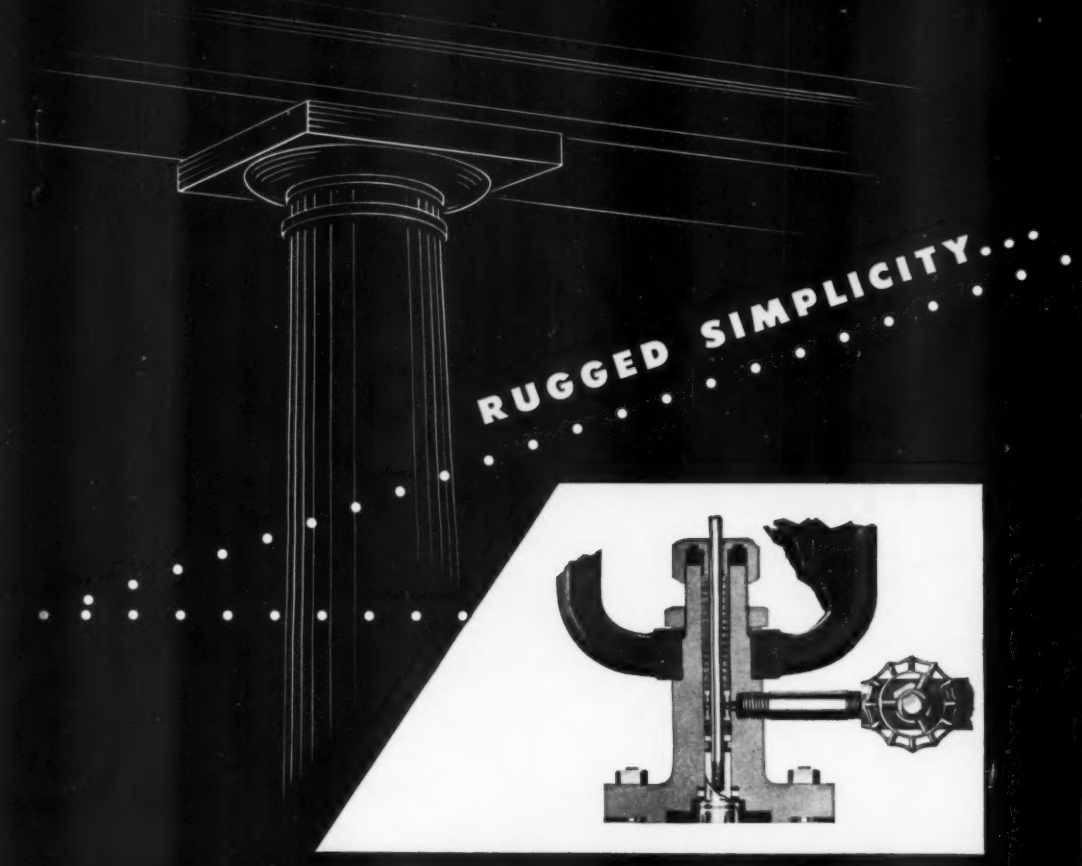
This exacting method of development and production is assurance that the fan installed on any Marley cooling tower will do the exact job it is designed for. Actual tests of every kind over long periods have proved it.

producers of
DOUBLE FLOW TOWERS
DRICOOLERS
AQUATOWERS
NATURAL DRAFT TOWERS
CONVENTIONAL TOWERS
SPRAY NOZZLES
DOUBLE FLOW AQUATOWERS

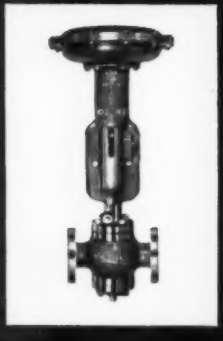
MARLEY

The Marley Company, Inc.

Kansas City 5, Missouri



through one-piece bonnet construction



The rugged, jointless, steel bonnet of the Honeywell Series 700 Valve affords greater strength, simpler disassembly for inspection and maintenance . . . has deep, integral stuffing box built to superior performance standards, top-and-bottom packed lantern gland to minimize leakage. The Honeywell Series 700 wide band proportioning valve comes in a full range of styles and sizes . . . has *all* the features you look for in a fine valve. Write today for your copy of Bulletin 700-3.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division,* 1906 Windrim Ave., Philadelphia 44, Pa.

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VALVE PRODUCTS

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First in Controls

OUTBOARDS GO ANYWHERE!

Red River gas pipe line crossing, by the Arkansas-Louisiana Gas Company of Shreveport. The outboard motor is a Johnson Sea-Horse 10.

Johnson SEA-HORSES for DEPENDability

SEA-HORSE 25

Here's a real test of outboard motor maneuverability—proof that outboards go *anywhere!* In shallow and obstructed waters, in tight places, it's the *only practical* marine power.

In oil and gas work, DEPENDability is a "must." That's why so many companies choose Johnson Sea-Horse outboard motors for their water operations.

With Johnson outboard motors, you can convert your work boats into DEPENDable power craft—at a fraction of the cost of inboard installations. You can operate economically—fuel consumption is low, repairs are quick and reasonable. You can transfer your power from boat to boat. And you can maneuver in waters where other types of boats dare not venture.

See your Johnson dealer. Ask about the outstanding Johnson features—Gear Shift (neutral-forward-reverse), Mile-Master Fuel Tank, Synchro Twist-Grip Speed Control, Neutral Clutch, and Angle-matic Drive. Look for his name under "Outboard Motors" in classified phone book.

Only outboard-powered boats can get to Sun Oil Company's reservoir tanks in the Wabash bottoms!

FREE! Write for fully illustrated literature on the 4 versatile Johnsons for 1952—ranging from 3 hp to 25 hp. A size for every outboard need!

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OBC *All hp is OBC Certified brake hp at 4000 rpm.*

NO BARRIERS TO CAPACITY FLOW

A.C.F. 2" and 3" Lubricated Plug Valves on flowing line headers, Southwest Exploration Company, Huntington Beach, California.

A plug valve that 'pinches' the flow is bound to cut down a pipe line's carrying capacity. A.C.F. exclusive CYLINDRICAL Plug Design makes possible a valve passage with at least as much area as the pipe opening. For fast, uninterrupted flow, A.C.F. Lubricated Plug Valves deserve your first consideration. Available with rectangular or full round port.

A.C.F. CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

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Want literature? Ask for Catalog 4-OG, American Car and Foundry Company, Valve Division, 1501 East Ferry Avenue, Detroit 11.

Good Move for Defense

The rapid growth of a national network of pipelines for the transmission of oil and gas is a *good move* to strengthen the nation's defense program.

Already more than 200,000 miles of transmission lines are in operation throughout the country. And according to a recent report applications to NPA call for 2,400,000 net tons of steel pipe for 12,700 additional miles of pipelines.

As a major supplier, Kaiser Steel is assisting this program with its fully-integrated line pipe production facilities.

Prompt, dependable delivery to line pipe users in the western two-thirds of the United States is another good reason why:

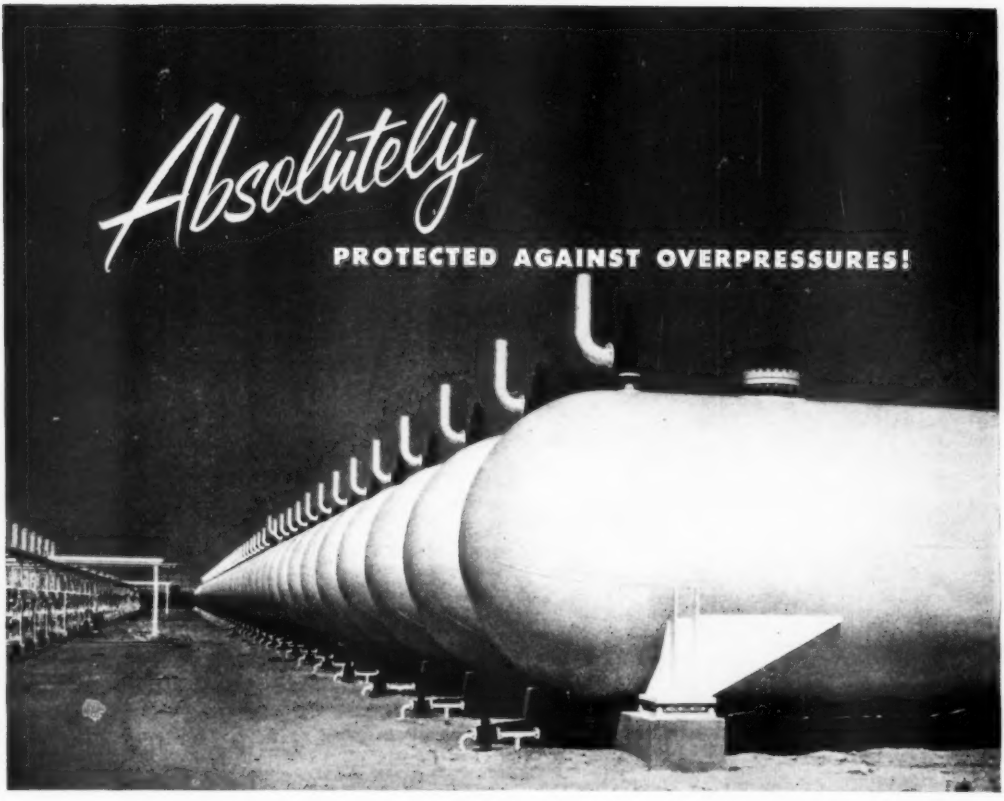
It's good business to do business with

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York



Uncontrolled pressures in processing equipment invite disaster. That's why so many unfired pressure vessels—gas, vapor and liquid storage tanks, pipelines, pumps—are protected by Consolidated Safety Relief Valves.

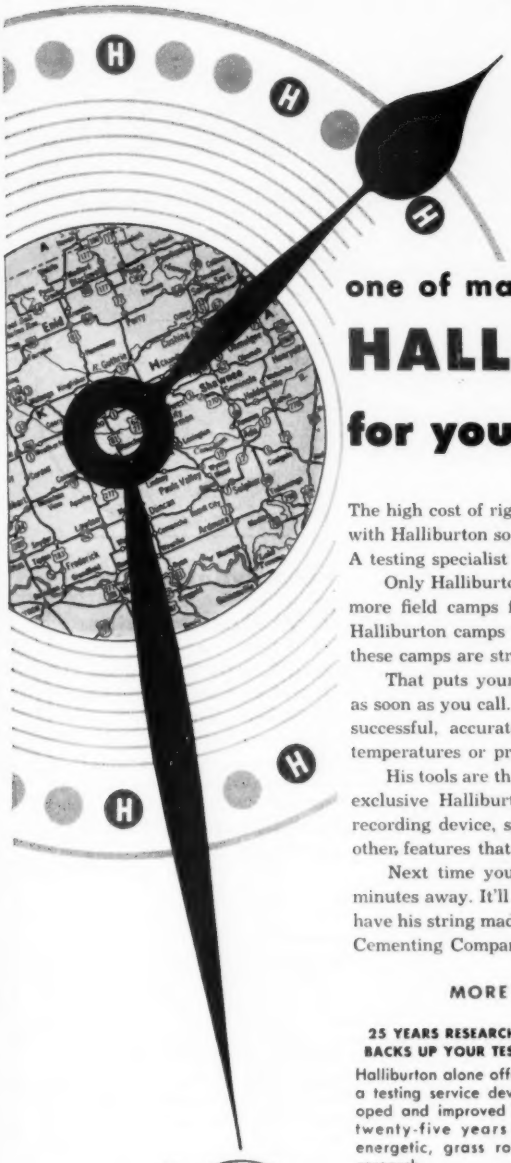
Dependable tightness is foremost in valve safety standards. Consolidated Safety Relief Valves don't leak under discharge piping stresses because outside bevel seat and floating guide construction permit the disc to be moved on a radial seating surface. Tightness is absolute in all positions within the deflection range. Continuously reliable performance at the rated capacity safeguard life, property and production, even in the severest service.

Consolidated Safety Relief Valves are widely used for another basic reason: *simple design.* With 25% fewer parts than ordinary safety relief valves, service and standardization problems are reduced, maintenance costs are cut. Get all the facts first hand. See your local Consolidated Distributor.

CONSOLIDATED SAFETY RELIEF VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** TULSA, OKLAHOMA

MAKERS OF 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES. BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.



JUST MINUTES AWAY!

one of many reasons why

HALLIBURTON'S *best* for your DRILL STEM TEST!

The high cost of rigtime makes waiting expensive—but you needn't wait long with Halliburton so handy. When you're ready for your test, so's Halliburton. A testing specialist can be there in a matter of minutes.

Only Halliburton can offer such speedy service, for Halliburton has many more field camps from which to serve you. At last count there were 177 Halliburton camps in the oil producing areas of the U.S. and Canada. 139 of these camps are strategically located in the Mid-Continent.

That puts your Halliburton Tester only minutes away and ready to go as soon as you call. He comes fully prepared and equipped to give you a safe, successful, accurate test—no matter how deep your well, how high the temperatures or pressures.

His tools are the most advanced and specialized in the industry, with many exclusive Halliburton features. These include the Bourdon Tube pressure recording device, special-duty packers, curved J-slots, automatic locks, and other features that make misruns a rarity with Halliburton.

Next time you're ready for a test, remember that Halliburton is only minutes away. It'll save you rigtime. Phone your Halliburton Tester and he'll have his string made up before you come out of the hole. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

MORE REASONS WHY HALLIBURTON'S BEST:

25 YEARS RESEARCH BACKS UP YOUR TEST

Halliburton alone offers a testing service developed and improved by twenty-five years of energetic, grass roots research.

MOST ADVANCED TOOLS AND TECHNOLOGY

Halliburton's highly specialized tools and exclusive features, its superior knowledge and experience, help make misruns a rarity.

GREATER ACCURACY IN PRESSURE RECORDING

The Bourdon Tube Pressure Recording Device, exclusive with Halliburton, gives you far greater accuracy at no extra cost.

HALLIBURTON

YEARS AHEAD IN DRILL STEM TESTING

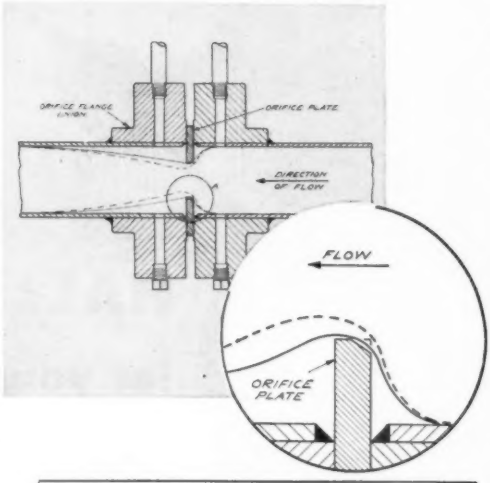
Back Up FLOW METER ACCURACY

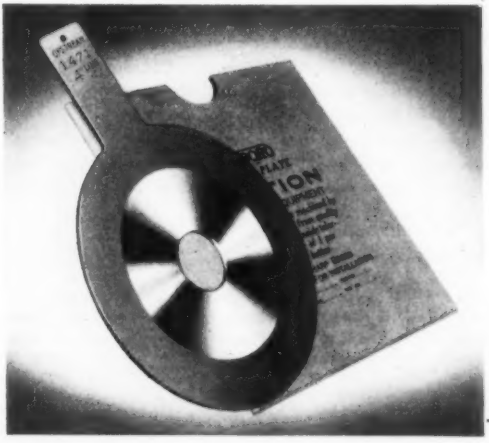
with Accurately-made Orifice Plates

THE PRECISION TOLERANCES of Foxboro Orifice Plates may seem extreme, but results over the years have paid off in worthwhile savings to users. These thin-plate, square-edge orifices are bored to an accuracy of 1/20th of 1% of the orifice diameter . . . which means a measuring accuracy within 1/10 of 1% (0.001).

The importance of the *square* leading edge can be seen from the diagram at the right. If the upstream edge of the orifice is dulled to a radius of as little as .005", it's equivalent to an orifice bored .01" too large . . . resulting in an error in flow measurement of as much as 2% or more, depending on orifice size.

Naturally, orifice plates made to close limits of accuracy require careful storage and handling. They are and should be regarded as a very important part of the flow meter installation.





Check these Advantages of FOXBORO Orifice Plates

- ★ **Precision bored, with square upstream edge, for maximum accuracy**
- ★ **Supplied in metal best suited to specific service conditions**
- ★ **Bored plates enclosed in individual envelopes for protection during shipment and storage**
- ★ **Easy to install between union flanges**
- ★ **Data always visible on projecting tabs**
- ★ **Low in cost**

Write, giving available details of your metering problem, for further details on Foxboro Orifice Plates. (Foxboro also furnishes flow nozzles, Venturi tubes, and Pitot tubes, whenever requirements call for these alternative primary elements.) We'll gladly send bulletin which describes Foxboro Flow Meters as well. Address: **The Foxboro Company, 602 Neponset Ave., Foxboro, Mass., U. S. A.**

FOXBORO ORIFICE PLATES

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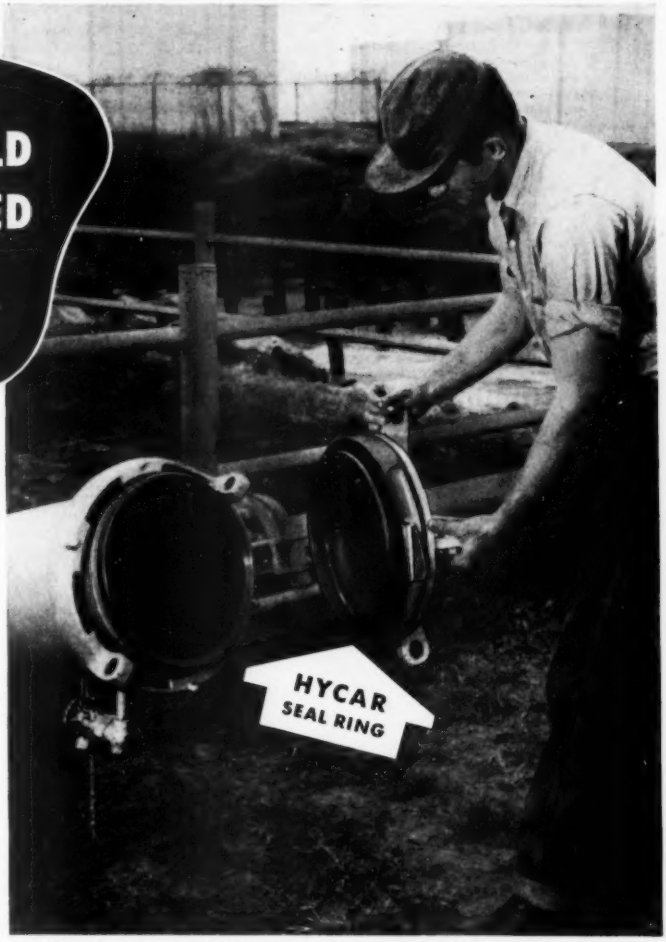
Another development using

B. F. Goodrich Chemical Company *raw materials*

HOW TO HOLD A GREASED PIG

...with Hycar's help!



Uniholt Scraper Trap made by Thornhill-Craver Company, Houston, Texas. Self-sealing Hycar gasket made by F. H. Maloney Company, Rubber Div., Houston, Texas. B. F. Goodrich Chemical Company supplies the Hycar rubber only.

WHEN this scraper trap is installed on pipeline terminals, the job of sending "pigs", or scrapers, gets a new boost in efficiency and economy. And the Hycar rubber sealing gasket helps in many important ways.

It's a self-sealing gasket—is placed under a predetermined amount of pressure when the trap is closed. As line pressure builds up, the lipped design traps the pressure to increase sealing compression.

Unlike conventional type closures, frequent opening and closing of this scraper trap never lessens the sealing quality of the Hycar gasket. That means longer, trouble-free operation—reduced maintenance costs.

That's just the start of this Hycar gasket's advantages. For this versatile rubber works equally well in all pipeline services, including natural gas, gasoline, sweet and sour crude oil, butane, propane and other petroleum products.

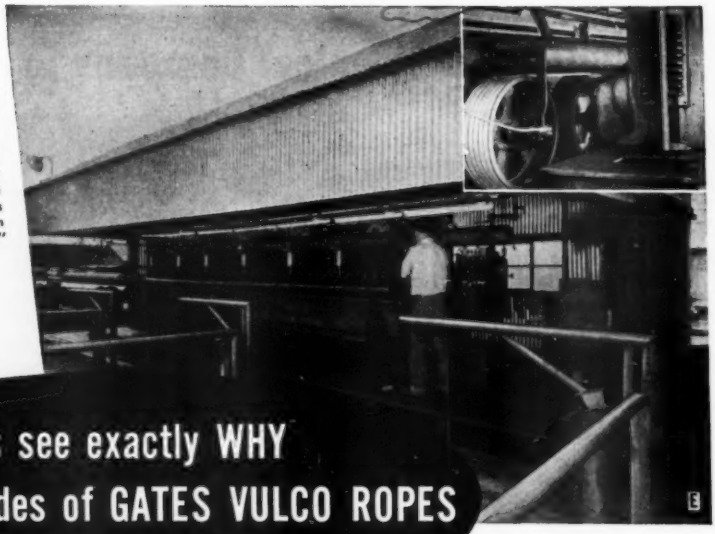
Hycar rubber compounds have many uses in the petroleum industry. They have exceptional resistance to heat and cold, abrasive mud, gas, oil and more damaging factors. They may help you develop or improve products—save time and money in new ways. For helpful technical bulletins and advice, please write Department HI-2, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Need high tensile strength? Hycar has it—plus abrasion resistance and more advantages.

Hycar
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



Forty-eight horizontal spindles carry milling cutters and simultaneously mill 48 slots in a well casing for the Oil Tool Corp., Long Beach, Calif. Mr. Lloyd Osborne, Machine Operator says of the Vulco Rope Drive: "The machine is really smooth now. There is none of the chattering and vibration we used to have."

Let's see exactly WHY the Concave Sides of GATES VULCO ROPES mean lower V-Belt Costs!

Every engineer knows how a V-belt *changes shape* when it bends around a pulley.

The top of the belt is under tension—making it grow *narrower.*

The body is under *compression,* causing the sides to bulge out!

Look at figure 1-A in the diagrams, herewith. There you see how a *straight sided* V-belt is forced to bulge in its sheave-groove—and this bulging naturally causes extra wear along the middle of the sides as indicated by the arrows.

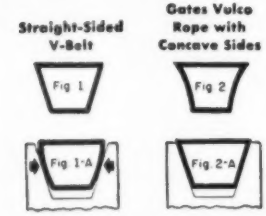
Now look at the figure 2-A. There you see how the precisely engineered Concave Sides fill out to an exact fit in the sheave groove.

Clearly, the Concave Sides press *evenly* against the V-pulley. This means uniform wear; longer life! The Concave Sides have *full traction;* wear longer because of *full contact!*

To sum up: The Concave Sides of Gates Vulco Ropes (U.S. Patent No. 1813698) give you (1) Less wear, (2) More pulley contact, (3) More sure power transmitted when needed!

Only V-belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-521

Gates®

Hose V-Belts Molded Rubber Goods for Industry

World's Largest Maker of V-Belts

VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY • DENVER • U•S•A

LOOK AT THE BULL O' THE WOODS GO, NOW THAT HE'S GOT A GREEN LIGHT FROM UPSTAIRS! HE'S BEEN ITCHING TO CLEAN THAT JUNK OUT OF HERE FOR YEARS!
YEAH, HE WELCOMED THAT SCRAP REP-RESENTATIVE LIKE A LONG LOST BROTHER! HAD TONS OF OLD MACHINERY AND BROKEN PARTS LINED UP BEFORE THE GUY EVER GOT HERE!
TODAY IT'S JUNK -- TOMORROW IT KEEPS A MILL FROM SHUTTIN' DOWN! MAYBE KEEPS US FROM SHUTTIN' DOWN, TOO... WHO KNOWS?
Copr. 1952 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.
J.R.WILLIAMS

America's greatest treasure hunt

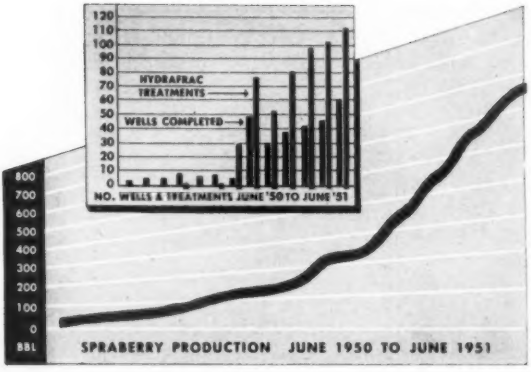
is now underway!

It's a hunt for scrap metal of all kinds desperately needed to keep production of everything for defense and civilian needs at peak levels. Some 9,000 steel salesmen working with local Chambers of Commerce Committees are calling personally on every business establishment where there is a possibility of locating metal not now being used. (For example:—a small button works scrapped 20 tons of obsolete machinery.) The businessman is then requested to sell his old steel or iron or copper or aluminum to a local scrap dealer who will sort, prepare, and resell it to the mills and foundries. *Help your local scrap representative when he calls,* or if he has already called on you *keep looking for scrap.* Junk your worn-out and broken machines and equipment now! Then put in a call to your local scrap dealer!

REMEMBER—STEEL IS 50% SCRAP!

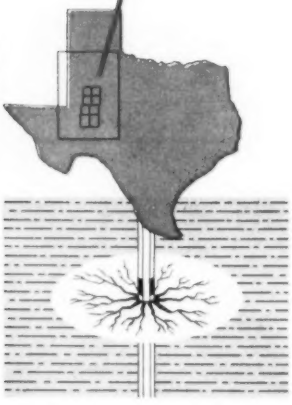
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

J&L STEEL



90% INCREASE PRODUCTION

by HALLIBURTON'S HYDRAFRAC SERVICE



An excellent example of how Hydrafrac treatment increases oil flow is shown in reports from Spraberry wells. 90% of those treated by Halliburton's Hydrafrac Service have been highly successful. Most of these were new wells on which initial production tests indicated less than 40 barrels per day. After Hydrafrac Treatment – average daily potential 10 to 15 barrels per hour flowing.

Hydrafrac treatments increase existing permeability and create *new* permeability by hydraulically fracturing the formation. Sands can be fractured at various intervals throughout the producing zone, with no subsequent cleanout required.

Basically, Hydrafrac Service comprises use of a viscous hydrocarbon gel carrying graded sand particles capable of holding the fractures open, chemicals which follow to reduce the gel viscosity, and packers and pumping equipment for producing the fracturing pressures.

More and more operators are using the process as a completion means. It's more economical and convenient while the rig is over the hole and postpones the time when additional well stimulation is required.

Before you pass up *any* possible pay, in new wells or old, find out first if Halliburton's Hydrafrac Service can make it a profitable producer.

Phone your nearest Halliburton representative – he will assist in the selection of wells for Hydrafrac Service which have high possibility for success. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN PRODUCTION IMPROVEMENT TECHNIQUES!

When they organized their salvage drive

DIAMOND ALKALI CHEMICALS

DIAMOND ALKALI more than doubled scrap shipments

WHY NOT GET CASH for your hidden scrap?

What firms like Diamond Alkali have done, your plant can do. All of us must dig deeper. As you know, it takes *one ton* of your old, obsolete and worn-out machinery, tools, dies, pipe and fittings, rails, chain, jigs, fixtures, rusted out tanks and boilers, to make *two tons* of new steel. The nation needs that steel, now. You need it. So, appoint a scrap collection team. Study all locations which are potential sources for scrap.

Sell it to your SCRAP DEALER

The procedure of returning scrap to the mills is far simpler than even the most elementary salvage program. Scrap commands an excellent price. So, turn it up and turn it over . . . to your scrap dealer for cash.

THIS 4-POINT PROGRAM GOT RESULTS:

● The Painesville, Ohio, plant of Diamond Alkali Company daily turns out hundreds of tons of alkali chemicals and allied products. When scrap metal shortages threatened, this producer put into effect a program which is channeling hundreds of tons of iron and steel scrap back to the mills.

Their successful program is based on planned *collections from four sources:*

1 **The continuous supply from plant maintenance, as machinists, pipefitters, ironworkers, and other craftsmen produce odds and ends in the regular performance of their work. This might be termed the "waste" from normal plant operations.**

2 **Scrap salvaged from the routine replacement of specialized equipment and materials of vital producing components.**

3 **Scrap salvaged as construction of new facilities, rehabilitation, and modernization goes on while the plant mobilizes to meet the need for greater alkali production.**

4 **Scrap salvaged from discontinued operations and from structures no longer used.**

Who did it? Naturally, many employees cooperated. The plant general manager designated the works engineer to head up the scrap collection program. He, in turn, appointed two plant engineering staff men to study locations which might be potential sources. Plant layout was studied to determine what could be scrapped, what could not. This "in-plant" team worked with the salvage department, already organized to handle routine scrap. An outside salvage firm was retained to dismantle an old bridge crane, other items. No possible supply of scrap metal has been overlooked.

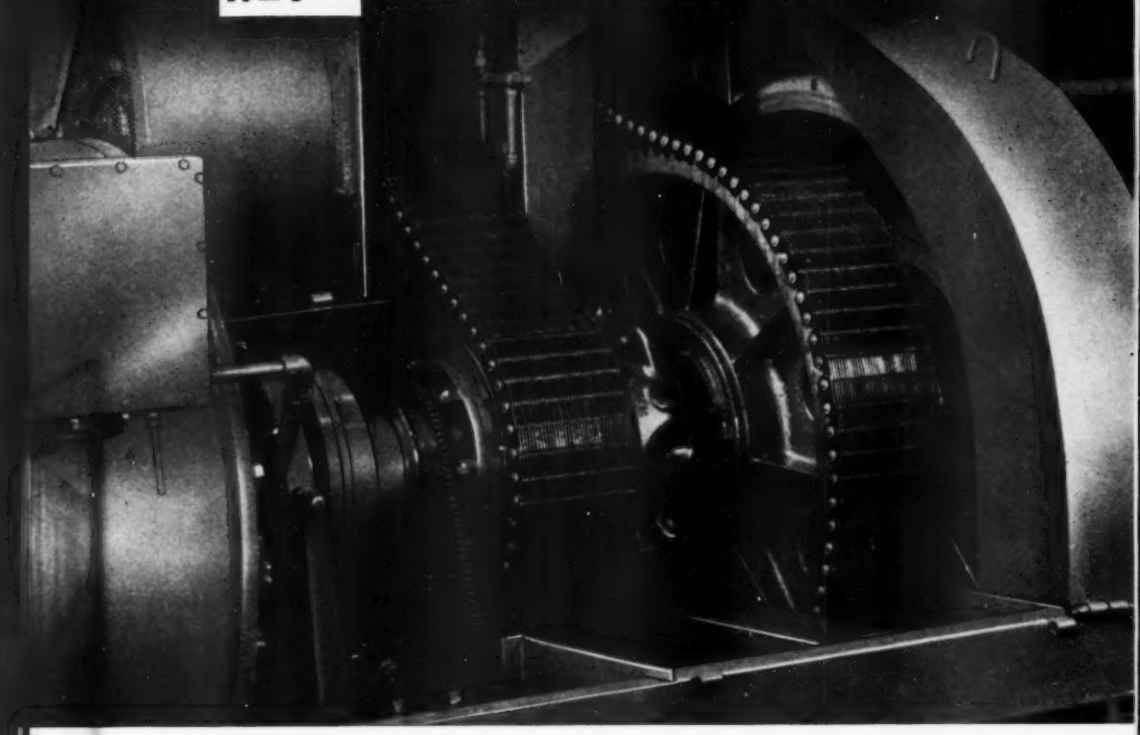
Results! By midyear, more scrap metal had come from the plant than ordinarily is shipped in a year's time. In one four week period alone, twelve full cars of scrap were started back to the hungry steel furnaces.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION

General Offices • Cleveland 1, Ohio

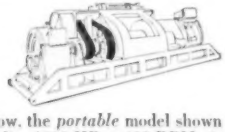
Morse **HY-VO** Drive for a new age in power transmission



Now, more horsepower, greater speed plus portability

possible for first time in oil field drawworks

Once, oil field drawworks powerful enough to drill 20,000-foot holes had the portability of small apartment buildings; had to be knocked down, trucked piecemeal from hole to hole site, and re-assembled. Very costly.



Now, the *portable* model shown above supplies 1500 HP at 600 RPM. And just two 2"-pitch by 12"-wide Hy-Vo Drives transmit its power. The Hy-Vo Drives operate at twice the speed with three times the load considered practical for conventional chain drives. Hy-Vo made this revolutionary, cost-slashing oil field development possible—and portable.

What Hy-Vo can do for you

A Morse Hy-Vo Drive will transmit more horsepower at higher speeds and lower cost than any other drive ever known. It opens the way to transmitting more horsepower from smaller, less expensive high-speed engines—without costly accessories.

Remarkable as it is, Hy-Vo is still only one of a complete line of power transmission products that has made the name Morse synonymous with exceptional engineering, exceptional quality, exceptional performance.

Write today for Hy-Vo Catalog C 72-51—or for information on Morse Silent Chain or Roller Chain Drives, Morse Flexible Couplings, Morse Drive Shafts, or Morse Clutches. (Hy-Vo orders must carry priority rating at present time.)

More than ever, M = PT—Morse means Power Transmission.

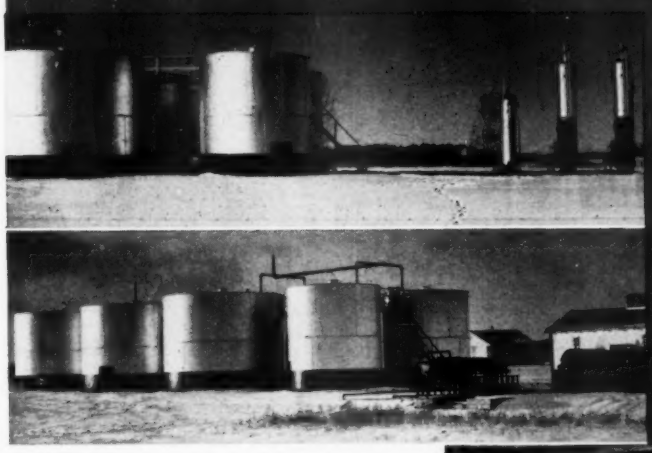
MORSE CHAIN COMPANY • Dept. 272 • 7601 Central Ave. • Detroit 10, Mich.

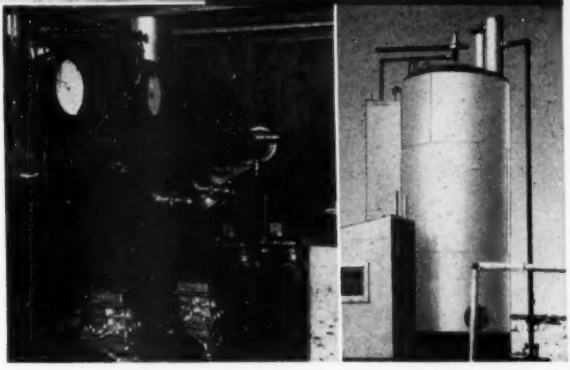
Branch offices serving the petroleum industry: Houston, Texas, 1312 LaBranch Avenue, P.O. Box 896; Pasadena, California, 1571 Harding Avenue; Pittsburgh, Pennsylvania, 503 Martin Building

MORSE
MECHANICAL
POWER TRANSMISSION
PRODUCTS

PRODUCTS OF BW BORG-WARNER

MALONEY-CRAWFORD TANKS, SEPARATORS, TREATERS, STAND UP UNDER WINTER CONDITIONS in CANADA





Severe winters require the best of equipment in addition to proper coverings and operation techniques.

Maloney-Crawford tanks, separators, and emulsion treaters have demonstrated they are capable of withstanding the extreme temperatures in Western Canada, which range from 40 to 60 degrees below, as well as in other cold weather localities.

Pictured in this ad are Maloney-Crawford tanks, separators, and treaters in Western Canada. Note the part shelter on the unit, at right, which encloses piping and gages; and the inside view of a shelter, at left, completely enclosing separator and other lease equipment affected by the cold.

Maloney-Crawford engineers are available to discuss winter problems with you and to suggest applications to fit your needs.

Call a Maloney-Crawford representative at any Stock and Service Center.

STOCKS AND SERVICE AT THESE PRINCIPAL OIL CENTERS

Artesia, N. M.; Corpus Christi, Tex.; Dallas, Tex.; Edmonton, Canada; Farmington, N. M.; Fort Worth, Tex.; Houston, Tex.; Lafayette, La.; Midland, Tex.; New Orleans, La.; Odessa, Tex.; Oklahoma City, Okla.; Pampa, Tex.; San Angelo, Tex.; Snyder, Tex.; Tulsa, Okla.; Wichita Falls, Tex.

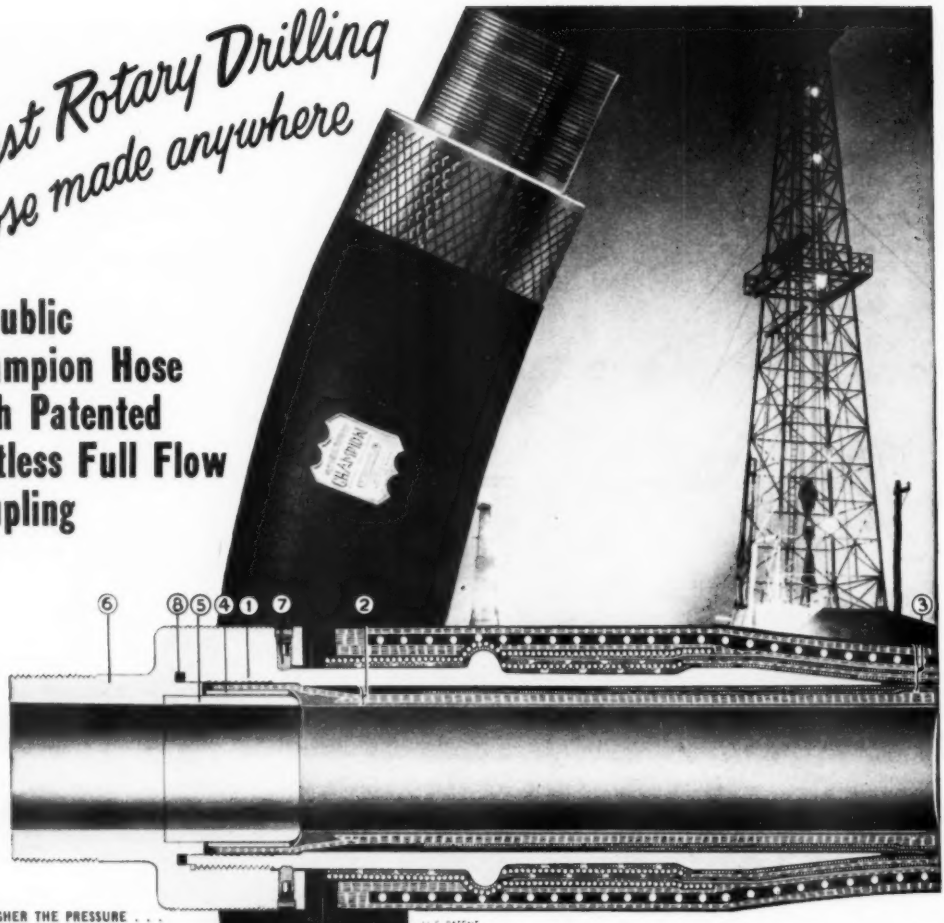
MALONEY CRAWFORD

MALONEY-CRAWFORD TANK & MFG. CO.

FACTORY AND GENERAL OFFICE: 38 NORTH PEORIA—BOX 659—TULSA, OKLAHOMA
EXPORT REPRESENTATIVE: Baird Lines, 420 Lexington Avenue, New York, N. Y.
CANADIAN REPRESENTATIVE: Maloney-Crawford of Canada, Ltd., Edmonton, Canada
TEXAS PANHANDLE REPRESENTATIVE: H. W. Waddell, Pampa, Texas.

Best Rotary Drilling Hose made anywhere

Republic Champion Hose with Patented Boltless Full Flow Coupling



U. S. PATENT No. 2,234,350

THE HIGHER THE PRESSURE . . . THE TIGHTER THE SEAL

In Champion Rotary Drilling Hose the nipple (1) is built in between the metal reinforcements of the hose carcass (2) and (3). The inner reinforced rubber structure (2) is anchored within the nipple and locked into leak-proof engagement by a brass expansion ring (4). This ring receives plenty of protection from the abrasive action of flowing grit by a special steel guard ring (5). As pressure pushes the reinforcing rubber structure (3) against the nipple assembly, a leak-proof union is established, and, ***as the pressure continues to increase, the tighter the seal becomes!*** Note that the cover cap (6) screws into position over the nipple assembly. It fits flush with the external diameter of the hose, leaving no projections to catch on the rigging or interfere with connections. The cap is held in position by submerged set screws and anchor cap seals (7). A rubber gasket (8) seals the joint between cap (6) and end of nipple (1).

● Republic's Champion Rotary Drilling Hose is a strong, flexible hose that's built to withstand severe shock and higher pulsating pressures.

Built-in steel muscles resist pressure, protect the hose against distortion. Oil-resistant Reprene throughout makes the hose practically immune to abrasion or deterioration from oil contact.

Champion Rotary Drilling Hose is available in standard lengths up to 60 feet. Type C Hose designed for 5000 psi test pressure, Type B for 4000 psi and Type A for 3000 psi. See your Republic Distributor or write direct for further information.

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

MID-CONTINENT DISTRIBUTORS

Jones & Laughlin Supply Co.
Tulsa, Okla.

The Bovaird Supply Co.
Tulsa, Okla.

EXPORT DISTRIBUTORS

Jones & Laughlin Supply Co.
230 Park Ave.,
New York 17, N. Y.

WEST COAST DISTRIBUTORS

W. C. Hendrie & Co., Inc.
405 Towne Ave.
Los Angeles, Calif.

Pacific Coast Rubber Co.
51 Main St.
San Francisco, Calif.

they're
custom-built
to fit the job!

Work boats, pleasure craft

Drilling rigs, centrifugal pumps, generator sets

Earthmovers, logging yarders and loaders

Buses and highway trucks

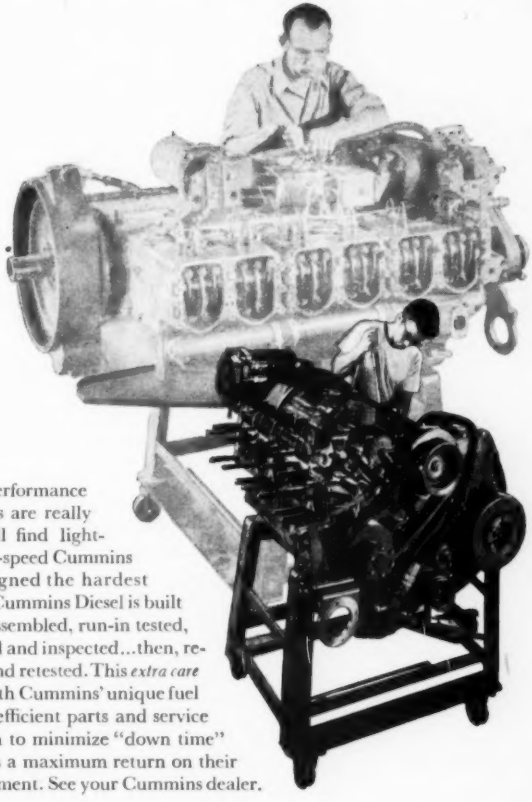
Off-highway trucks, crawler tractors

Shovels, cranes, industrial locomotives and stretchers

Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

Cummins® Diesels do so many jobs so much better

they're
BUILT NOT ONCE BUT TWICE



Wherever performance requirements are really rough, you'll find lightweight, high-speed Cummins Diesels assigned the hardest jobs. Every Cummins Diesel is built *TWICE*—assembled, run-in tested, disassembled and inspected...then, reassembled and retested. This *extra care* combines with Cummins' unique fuel system and efficient parts and service organization to minimize "down time" ...give users a maximum return on their diesel investment. See your Cummins dealer.

CUMMINS Dynamatic DIESEL

TRADEMARK REG. U.S. PAT. OFF.

Diesel power by CUMMINS

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Export: Cummins Diesel Export Corporation • Columbus, Indiana, U.S.A. • Cable: Cumdiex

FACT

An average-size refinery can save $50,000 in first cost by using Alcoa Aluminum Heat Exchanger Tubes!

(Figured on 20,000 Tubes)

This is based on current tube prices . . . ⅓ less than seamless mild steel, ½ as much as Admiralty, ⅙ the cost of stainless. Compare these savings in aluminum against the metal you now use.

ALCOA

knows most about their use and application

Alcoa pioneered the use of aluminum in heat exchanger tubes 43 years ago. Although their sale today is limited by government regulation, you will want to start planning with a copy of the booklet, "Alcoa Aluminum Heat Exchanger Tubes". Write:

ALUMINUM COMPANY OF AMERICA
18648 Gulf Building • Pittsburgh 19, Pa.

OVER 6-MILLION FEET OF ALCOA TUBES ARE IN USE FOR APPLICATIONS LIKE THESE . . .

PETROLEUM

Condensers handling hydrocarbon fractions from such processes as Thermal and Catalytic cracking, reforming, polymerizing, etc.
Vapor recovery condensers
Lube oil coolers
Natural gas compressor aftercoolers
Recompressor aftercoolers
Hydrogen sulfide gas coolers
Furfural condensers and heat exchangers
Propane chilling
Wax sweaters
Lean oil—rich oil exchangers
Amine solution coolers
Glycol-amine solution coolers, heat exchangers and reboilers

CHEMICAL

Butanol
Ethanol
Ethylene Glycol
Glycerin
Hydroabietyl
Isopropanol
Methanol
Phenol
Propylene Glycol
Acetaldehyde
Formaldehyde
Furfural
Heptaldehyde
Acetic acid
Stearic, Palmitic, Maleic Oleic acids
Butyric acid
Naphtha
Ricinoleic acid
Acetanilide
Ammonia
Hydrogen Cyanide
Nitric acid (concentrated)
Pyridine
Hydrogen Sulfide
Benzene
Dichlorobenzene
Gasoline
Gelatin
Hydrogen Peroxide
Turpentine
Xylene

Use Alcoa Alclad 3S-H14 Heat Exchanger Tubes with fresh, brackish and salt-cooling waters

In over half a hundred fields

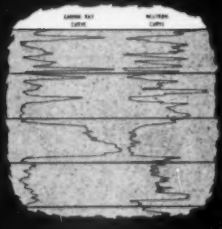
QUANTITATIVE INTERPRETATION

"HOW MUCH"

"WHERE"

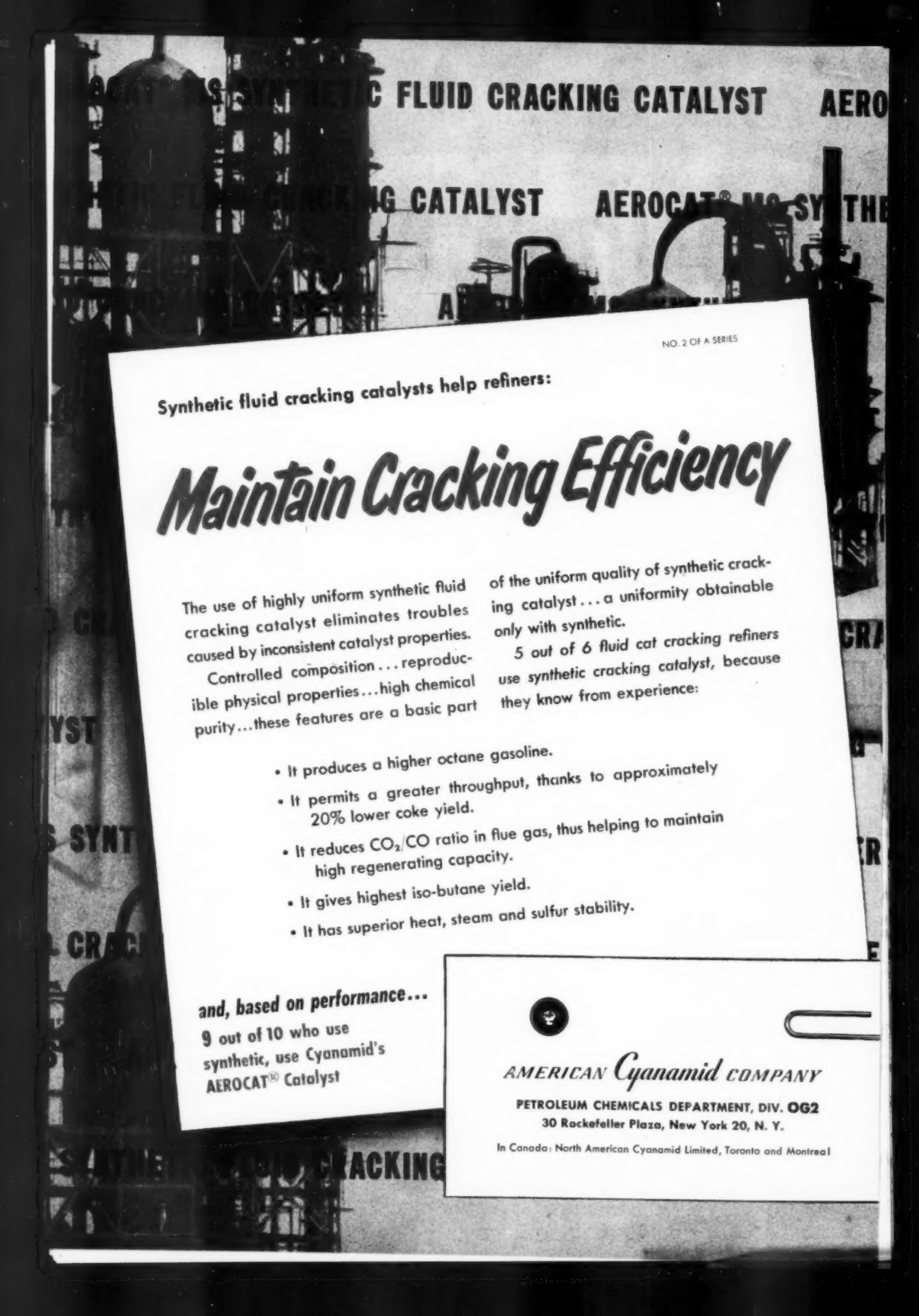
Lane-Wells Radioactivity Well Logging is now giving double value in many oil areas. Improved techniques of logging make it possible, today, to evaluate the responses of certain formations in terms not only of "where," but also "how much"! This interpretation of fluid-filled porosity has been proved accurate enough for most commercial purposes. It's like money in the bank!

This service is being extended, as rapidly as possible, to other oil areas where tests show that formation responses to the logging instruments will permit such quantitative interpretation. Your Lane-Wells man can tell you more.



Tomorrow's Tools – Today!

Radioactivity Well Logging by



NO. 2 OF A SERIES

Synthetic fluid cracking catalysts help refiners:

Maintain Cracking Efficiency

The use of highly uniform synthetic fluid cracking catalyst eliminates troubles caused by inconsistent catalyst properties.

Controlled composition . . . reproducible physical properties . . . high chemical purity . . . these features are a basic part of the uniform quality of synthetic cracking catalyst . . . a uniformity obtainable only with synthetic.

5 out of 6 fluid cat cracking refiners use synthetic cracking catalyst, because they know from experience:

- It produces a higher octane gasoline.
- It permits a greater throughput, thanks to approximately 20% lower coke yield.
- It reduces CO_2/CO ratio in flue gas, thus helping to maintain high regenerating capacity.
- It gives highest iso-butane yield.
- It has superior heat, steam and sulfur stability.

and, based on performance...

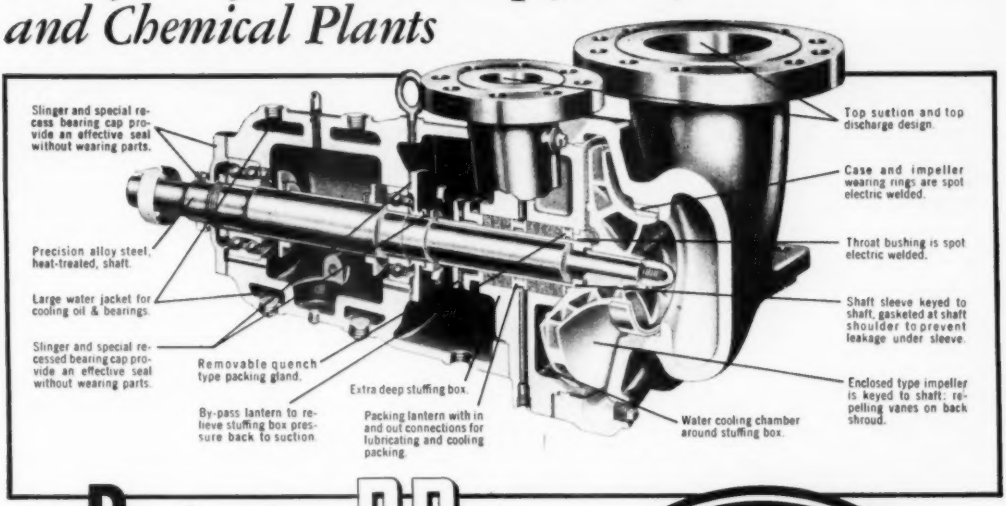
9 out of 10 who use synthetic, use Cyanamid's AEROCAT® Catalyst

AMERICAN Cyanamid COMPANY

PETROLEUM CHEMICALS DEPARTMENT, DIV. OG2
30 Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Toronto and Montreal

The **PEERLESS IDEA** *of the Modern Heavy Duty Process Pump for Refineries and Chemical Plants*

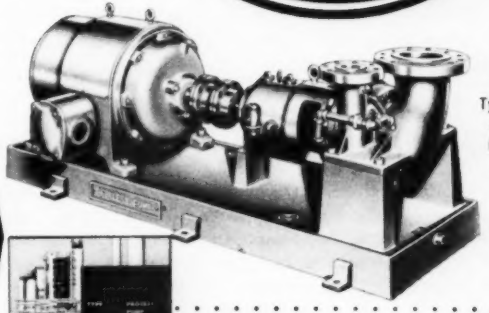

Slinger and special recess bearing cap provide an effective seal without wearing parts.
Precision alloy steel, heat-treated, shaft.
Large water jacket for cooling oil & bearings.
Slinger and special recessed bearing cap provide an effective seal without wearing parts.
Removable quench type packing gland.
By-pass lantern to relieve stuffing box pressure back to suction.
Extra deep stuffing box.
Packing lantern with in and out connections for lubricating and cooling packing.
Water cooling chamber around stuffing box.
Enclosed type impeller is keyed to shaft; repelling vanes on back shroud.
Shaft sleeve keyed to shaft, gasketed at shaft shoulder to prevent leakage under sleeve.
Throat bushing is spot electric welded.
Case and impeller wearing rings are spot electric welded.
Top suction and top discharge design.

Peerless Type PR

ESPECIALLY DESIGNED FOR PUMPING HYDROCARBONS, WATER AND CHEMICAL SOLUTIONS AT ELEVATED TEMPERATURES AND PRESSURES

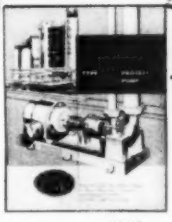
PEERLESS PUMPS

The sectional view above shows many of the important Type PR pump design and construction features. Other Type PR advantages include maximum parts interchangeability, rugged center-line-mount, extra-low NPSH requirements, optional use of mechanical shaft seal instead of stuffing box, availability in various alloy materials and a complete range of sizes. Some sizes can be furnished from stock in standard materials.



Exterior view Type PR pump. Also available in end-suction top-discharge design.

WRITE FOR NEW BULLETIN giving complete construction details, operating characteristics and application data. Mail coupon at right today.



PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION

Address inquiries to Factories at:
Los Angeles 31, California and Indianapolis 8, Indiana
Offices: New York, Chicago, St. Louis, Atlanta, Dallas, Plainview and Lubbock, Texas; Fresno, Los Angeles, Phoenix, Albuquerque, N. M., Tulsa

PEERLESS BUILDS *Dependable* **PUMPS**

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26
Los Angeles 31, California

Please send us copy of Peerless Type PR Pump Bulletin No. B-1605.

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COMPANY _____

STREET _____

CITY _____ STATE _____

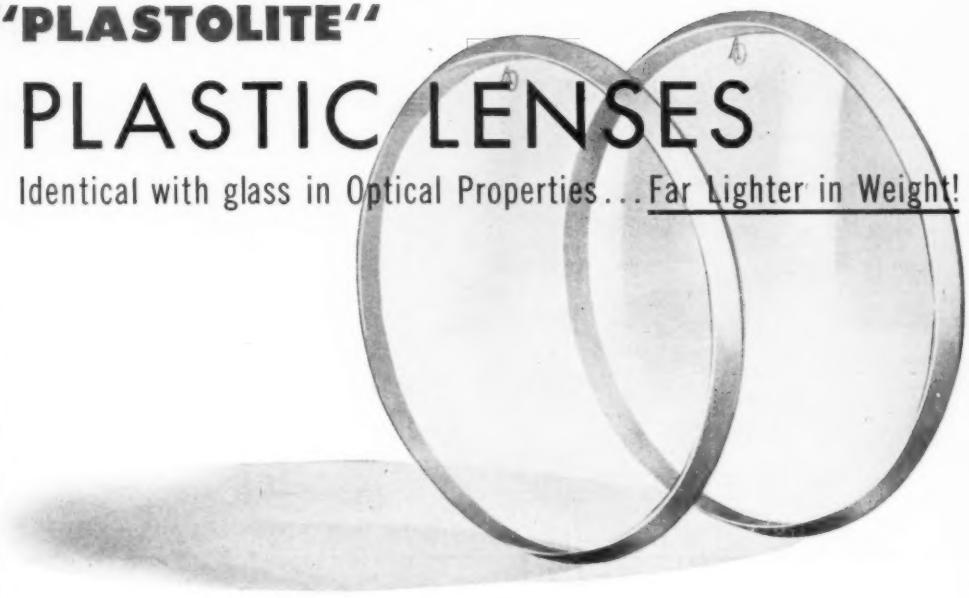
O&GJ

AO Announces

"PLASTOLITE"

PLASTIC LENSES

Identical with glass in Optical Properties... Far Lighter in Weight!



HERE IT IS...

the quality eye protection in plastic lenses many safety directors have wanted . . . the answer for workers who need protection but demand lightness heretofore unobtainable . . . the answer for companies who seek the enthusiastic cooperation of all exposed employees in cutting the high costs of eye accidents.

Made in the World's Cleanest Rooms!

Interested in plastic for years, AO has conducted constant research both in the protective properties of this material and in the atmosphere, facilities and controls required to assure maximum quality in the manufacturing process. In a new safety plant section at Brattleboro, Vermont, where Plastolite plastic lenses are made, all foreign matter is excluded which might impair the quality. Not only are the premises dust-free, lint-free and air conditioned—the workers wear special clothing! What's more, AO Plastolite lenses undergo a multitude of tests and inspections. Result: lenses with the optical properties traditional with AO that conform to the highest known standards!

RECOMMENDED USES:

For workers exposed for long periods... women workers... supervisors, foremen, plant visitors. Especially desirable for electronics work and spot welding. AO Plastolite lenses provide excellent protection against impact particularly where flying particles are small and acid exposures are no problem. NOTE THE LIGHT WEIGHT OF THESE LENSES *IN YOUR HANDS* AND *OVER YOUR EYES!*

AVAILABLE ON YOUR FAVORITE AO GOGGLE

AO Plastolite lenses are available as 6 curve lenses in all eye sizes on your favorite AO safety goggle. Your nearest AO Safety Products Representative can supply you with this outstanding advance in eye protection.

AO's Industrial Vision Program
Increases Production, Decreases Accidents.
Write today for booklet "Improved Industrial Vision."

American Optical Company
SAFETY PRODUCTS DIVISION

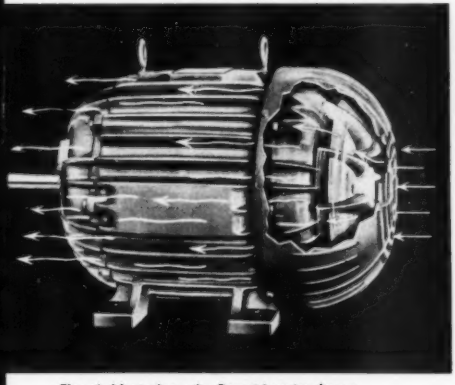
SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

ELLIOTT Crocker-Wheeler Sealedpower MOTORS

Sealedpower motors driving pumps in a chemical plant, outdoors, in fume-laden atmosphere.

Note respirator and rubber gloves on the man turning the valve.

They live a Tough Life!



The air blast along the finned housing keeps the sealed-power motor cool and clean.

Working under corrosive chemical fumes so powerful that the operator must wear rubber gloves and a respirator . . . exposed at all times to snow, sleet, rain, flying dust, heat and cold—these motors take it all, and like it.

Consider what "Sealedpower" motors save. They need no housing, for they supply their own — weather-proof and fume-proof. They need no special consideration as to location—anywhere will do, indoors or out. They need mighty little care, for these are the famous Crocker-Wheeler Sealedpower motors, totally enclosed, which more than ten years ago brought to industry the advantages of their finned case, self-cooled and self-cleaned by a directed air blast that blows away both heat and dirt. They are today's answer to today's trend toward outdoor installation. Get the facts—write for the Sealedpower bulletin.

ELLIOTT COMPANY • *Crocker-Wheeler Division* • *Ampere, N. J.*

PLANTS AT: JEANNETTE, PA. • RIDGWAY, PA. • AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.

BRANCH OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES

ELLIOTT *Approved* SERVICE SHOPS COVER THE COUNTRY

CW-34

You're a step ahead with ELLIOTT

These tubes have service "built in"

CHASE ANTIMONIAL ADMIRALTY

(a patented alloy)

Since 1935, millions of pounds of Chase Antimonial Admiralty* tubes have been installed and are serving well. This testifies that they'll give you years of service, too.

These tubes resist dezincification because they have *enough* antimony. And because antimony doesn't affect grain structure, it will not weaken the tube.

Chase Antimonial Admiralty* stays tough . . . stands up under heavy duty. Send coupon for FREE book on Condenser and Heat Exchanger Tubes.

CHASE WAREHOUSE STOCKS:
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also carried by —
Vinson Supply Co., Tulsa
Standard Brass & Mfg. Co., Houston.
*U.S. Pat. No. 2,061,921

FREE CHASE BOOK discusses corrosion problems and selection of proper alloy for condenser and heat exchanger tubes.

Chase Brass & Copper Co., Dept. OGJ 252
Waterbury 20, Conn.

Please send me Free Book on Condenser and Heat Exchanger Tubes.

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Chicago	Houston†	Newark	Rochester†	(†sales office only)
Cincinnati	Indianapolis	New Orleans	St. Louis	

WHEREVER ENGINES WORK

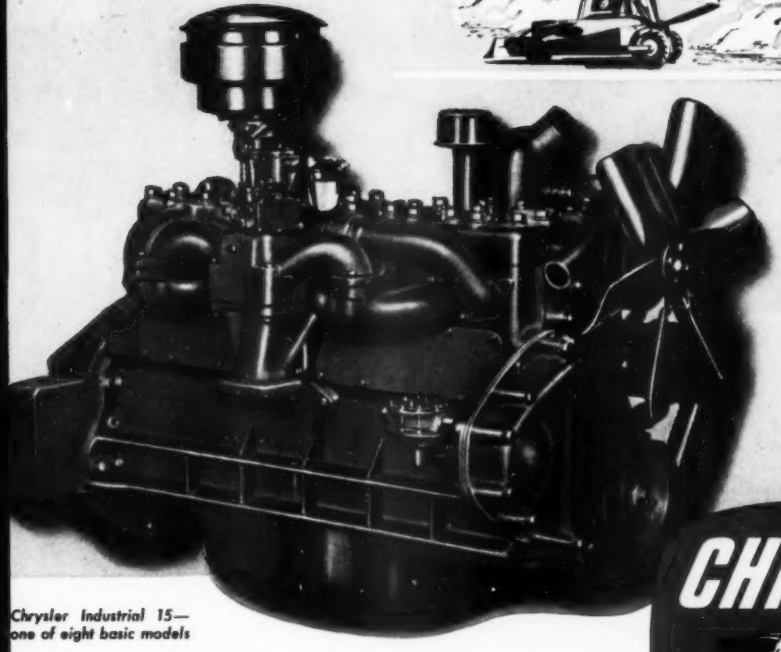
In Construction, Chrysler Powers Ditching Machines • Cranes • Truck Mixers • Shovels • Loaders • Yarders • Concrete Mixers • Road Pavers • Crane Carriers • Scoop Tractors

In Industry, Chrysler Powers Air Compressors • Hoists • Derricks • Pumps • Generators • Tractors • Arc Welders • Baling Machines • Conveyors • Tackle Blocks • Winches

Chrysler Industrial Engines Do a Better Job at Lower Cost!

In Farming, Chrysler Powers Tractors • Combines • Gang Mowers • Spreaders • Irrigation Equipment • Orchard Sprayers • Hay Choppers • Pumps • Feed Mills • Sprinklers.

In Other Fields, Chrysler Powers Locomotives • Motor Coaches • Air Conditioning Equipment • Pulp Machines • Drilling Equipment • Fire Pumps • Snow Plows • Street Flushers • Saw Mill Equipment • Oil Well Pumps and Drillers



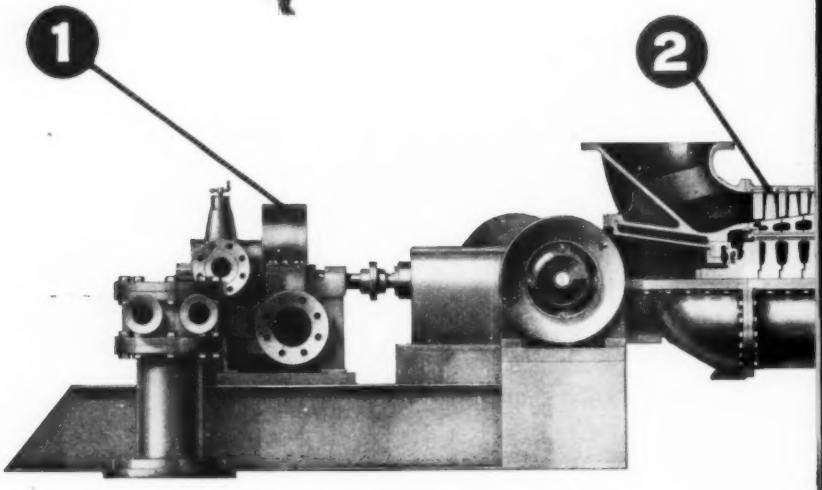
Chrysler Industrial 15—one of eight basic models

More manufacturers, more operators of industrial equipment are discovering the brilliant efficiency of Chrysler Industrial Engines on scores of different applications.

For Chrysler Industrial Engines are built *solely for industrial jobs.* Furthermore, Chrysler Industrial Engines are designed and engineered to meet the *specific working requirements* of each type of equipment they power. They can also be adapted to special regional operating conditions.

A letter of inquiry will bring an engineer well qualified to discuss your particular application. Address: *Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.*

DESIGNED for better gas pumping flexibility



Special G-E features like these provide service reliability, easy maintenance!

1. Important auxiliaries are shaft-driven—The power plant is self contained, and when operating, supplies electric power for camp and all station auxiliaries.

Complete automatic control provides starting, supervision and full protection to power plant. Standard familiar types of instruments and relays are assembled on metal-enclosed switchboard to centralize all control.

2. High efficiency axial flow compressor—The precision-balanced rotor is composed of several wheels bolted to stub shafts, with chrome-iron alloy blades to resist corrosion and erosion, secured by strong dovetails.

3. Periodic maintenance is easy—The all-metallic combustion chambers include stainless steel inner shells to withstand combustion temperatures. These are easily removable for inspection.

4. Strength where strength is needed—The composite turbine wheels have high-temperature stainless steel rims, welded to a forged main shaft and body. The few stages of the impulse type turbine permit use of long-life erosion-resistant buckets of high-temperature materials, with liberal clearances.

GENERAL ELECTRIC

661-3C

New G-E combustion gas turbine—inherently suited for gas pipeline pumping—provides adjustable-speed flexibility for pipeline flow; saves water, oil and manpower!

A "natural" for gas pipeline pumping—that's General Electric's combustion gas turbine! Specifically designed for centrifugal compressor drive, it gives you low-cost operation. In addition:

—You can save on operating manpower and supplies. Power plant control is automatic and self-protecting, with all the important auxiliaries shaft-driven from the main unit.

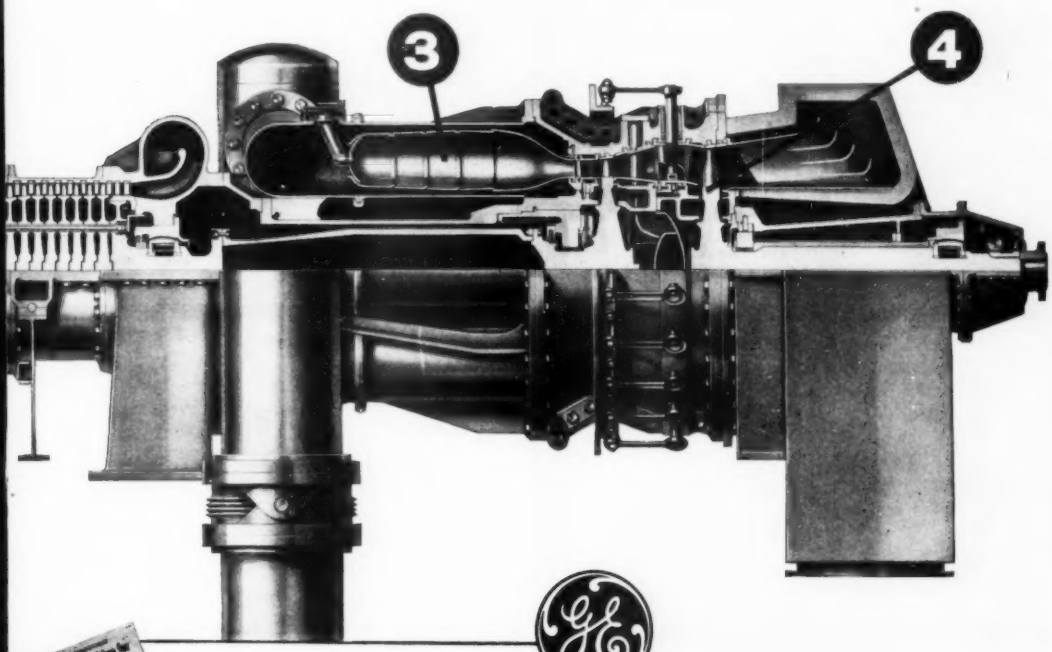
—You save on cooling water—an important point where water is scarce.

—You save on oil. A typical 5000-hp installation requires little or no make-up oil.

—You get adjustable speed for flexibility of operation to suit a variety of pipeline-flow conditions.

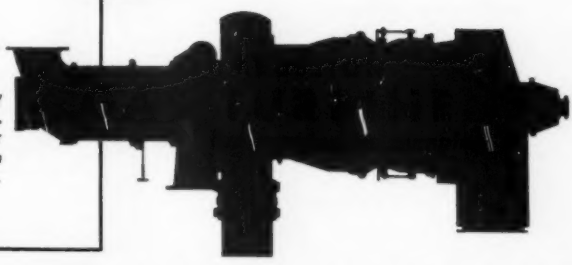
—You get up to 25 per cent extra hp in winter, when demand for gas is greatest.

Your G-E representative will gladly discuss this gas turbine in terms of *your* gas pipeline operation.



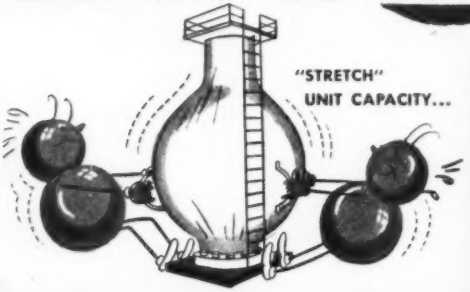
Send for New Bulletin!

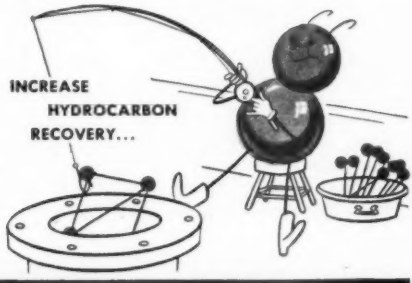
A new 16-page illustrated booklet fully describes the G-E gas pipeline gas turbine. For your copy (Bulletin GEA-5530) call your nearest G-E sales office or write *Section* 661-30, *General Electric Co., Schenectady 5, N.Y.*

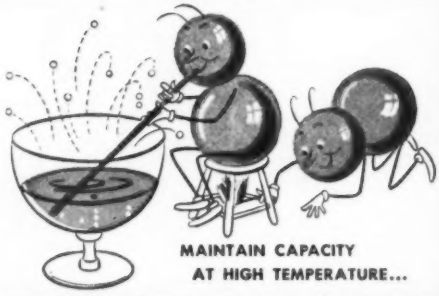


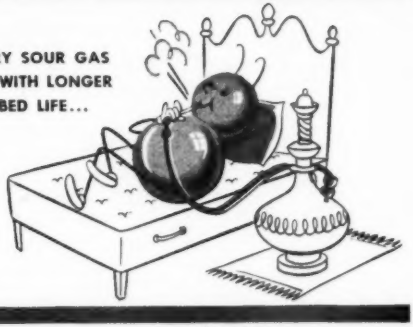
—backed by 45 years of turbine leadership!

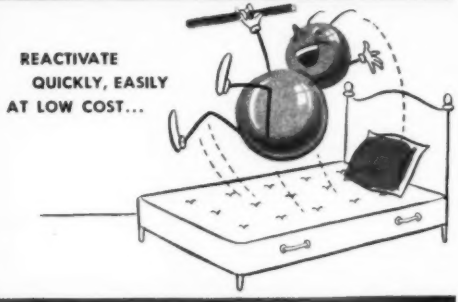
LOOK WHAT MR. SOVABEAD CAN DO IN YOUR DEHYDRATOR!











NOW... S/V Sovabead *is recommended* by most leading designers and manufacturers of solid-type natural gas dehydration units... *is used* by a majority of all operators of such units... *is performing satisfactorily* in hundreds of installations throughout the world!

Let S/V Sovabead improve *your* dehydration operations. Call your Socony-Vacuum Representative today!

SOCONY-VACUUM

Process Products

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates:
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

WHAT KONTOL DOES

KONTOL DOES

Prevent corrosion—by forming a tightly adsorbed protective film on the metal surfaces of production equipment.

Prevent production interruptions—by eliminating the frequent break-downs and equipment failures caused by corrosion damage.

Save time—by being easy to use, by not complicating production procedures, by helping to keep the wells on production.

BOTH are important

WHAT KONTOL DOESN'T

KONTOL DOES NOT

Require elaborate application procedures—it can be pumped, lubricated or dumped into the well, or applied in solid stick form.

Require special safety measures—it is safe and convenient to use. No gloves, goggles, masks, or extraordinary precautions are required.

Complicate ordinary production procedures—it does not render emulsified crudes more difficult to demulsify. It does not deposit well-plugging precipitates.

A cheap corrosion preventive is not necessarily economical. Safety in handling, ease of application and the avoidance of treating difficulties or formation-plugging precipitates are all values to be carefully considered in selecting a corrosion inhibitor.

KS2-2

TRETOLITE COMPANY
SAINT LOUIS 19, MISSOURI · LOS ANGELES 22, CALIF.

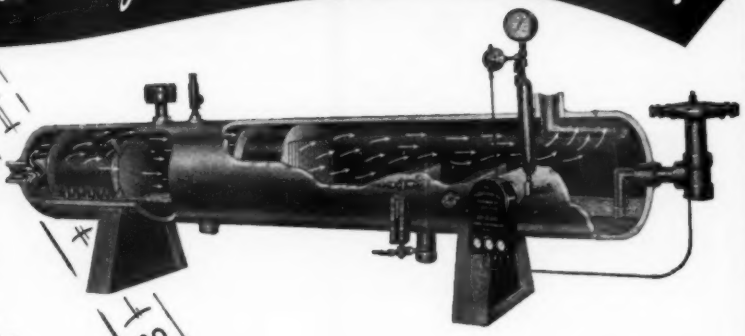
Chemicals for the Petroleum Industry

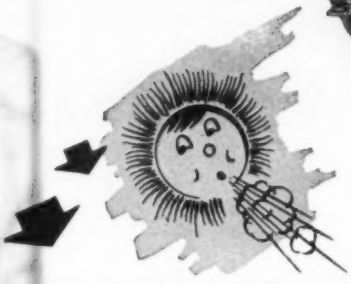
CORROSION INHIBITING • DEHYDRATING • DESALTING
WATER DE-OILING • SCALE PREVENTING • PARAFFIN REMOVING

PARKERSBURG...

SINGLE TUBE HORIZONTAL SEPARATORS

Operate Safely at Lower Temperatures!



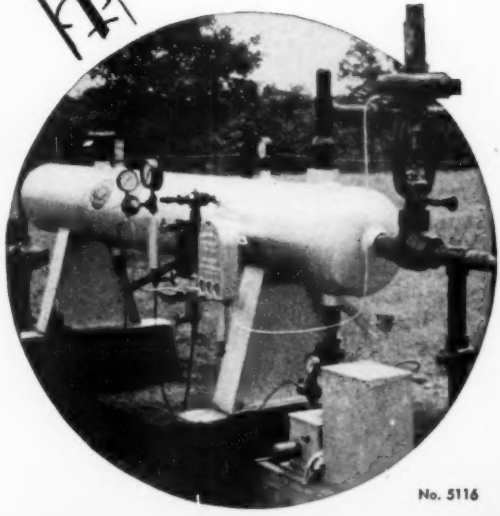


Parkersburg Horizontal Separators are designed to handle any type of fluid . . . heavy, light and foamy with maximum efficiency and dependability, but are particularly recommended for handling light, foamy crudes and condensates. They do the basic jobs of either a gas distillate separator or an oil and gas separator.

Last winter's record cold proved Parkersburg Horizontal Separators have an important money and trouble saving plus value. With the warm gas and separated liquids contained in the same shell, the separated liquids run a temperature 15 to 20 degrees higher than ordinary twin tube separators. These extra degrees of temperature, provided in the warm gas, helped prevent freezing during the severe cold weather.

The extra large shell diameter combined with the shape and internal elements of the Parkersburg Horizontal Separator, provides greater facility for natural separation than other horizontal separators of the same capacity. The exclusive Parkersburg No-Bleed Level Controller, controls the liquid level within an extremely small range to maintain perfect balance between retention time for the liquid and velocity of the gas to obtain maximum separation.

Specify Parkersburg Horizontal Separators for superior performance. Your Parkersburg Representative will gladly furnish complete data on the separator required for your type of fluid.



No. 5116

PARKERSBURG RIG & REEL CO.
PARKERSBURG, WEST VA.

PARKERSBURG

PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas

TUCKED AWAY HERE ON COUNTLESS RIGS...A WONDERFUL SAFEGUARD:

J&L WIRE ROPE

Steel in rope that runs over crown-block sheaves must take into account not only tremendous weight and strain . . . but the paramount importance of safety below.

If you are ever uneasy about traveling weight above the derrick floor, the facts about J&L Wire Rope will interest you greatly. Ask at your near-by Jones & Laughlin Supply store or write us at Tulsa.

Do you have your copy of the J&L booklet entitled WIRE ROPE IS A MACHINE? Ask for it. It is interesting and valuable.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

Jones & Laughlin Supply Company

J&L STEEL

General Offices: TULSA, OKLAHOMA

Coated and wrapped—ready for long service

Best barrier against corrosion...

BITUMASTIC® ENAMEL

Bitumastic Enamel being machine-applied

● If you keep moisture away from pipe-line surfaces with a protective coating, you prevent corrosion. But there's one point to bear in mind: *ordinary* protective coatings just can't keep out moisture, year after year.

But Bitumastic Enamels can—*because they're far from ordinary.*

First, these durable enamels are processed from a base of selected coal-tar pitches, *making them impervious to moisture.* Further, they make a tight bond with the pipe, and don't disintegrate with age. And they are capable of applications in one coat to a substantial thickness of approximately $\frac{3}{32}$ of an inch. Finally, they are chemically resistant to soil elements, and maintain continuously high electrical resistance.

Through the years, these qualities have proved themselves. Many oil and gas pipe lines, protected by Bitumastic Enamels in the '20's, are still giving good service today.

Specify Bitumastic Enamels and give your pipe lines the same effective protection against corrosion. Your Koppers representative will give you complete details and estimates.

Bitumastic Enamels soon available from Koppers new California Plant!

As soon as present construction work is completed, Koppers will be able to supply Bitumastic Enamels from a new plant at Fontana, California. The plant is being built to give you better service in the West.

KOPPERS BITUMASTIC ENAMELS

REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 203-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

Compare... FEATURES QUALITY PRICES

- ★ 46" x 10½" brake rings.
- ★ 24" x 40" drum barrel.
- ★ Full vision air panel control, the best control arrangement on any drilling rig.
- ★ Air-Tube disc clutches — the world's best — ON ALL DRIVES.
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- ★ Four speeds to the rotary table.
- ★ New Air-Tube disc clutch on water pump drive controlled from driller's control panel.
- ★ New sectional box type compound, the first of its kind. Each engine and compound section can be moved in one unit without danger of engine getting out of line with compound.
- ★ New Auxiliary Accessory drive built into compound, a feature that is exclusive, so far as is known.

and you'll choose... Wilson

ATLAS RIG

RATED CAPACITY:
10,000 ft.—4½" Drill Pipe
12,000 ft.—3½" Drill Pipe

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MANUFACTURING CO., Inc.

WICHITA FALLS, TEXAS

NOW...THE STRONGEST PART OF ALLOY PIPING SYSTEMS!

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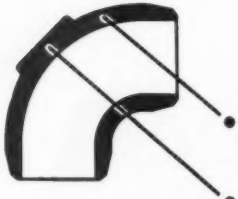
KEY-KAST

ALLOY STEEL
WELDING
PIPE FITTINGS

ALL SHAPES . . . S

LONGER LIFE BUILT IN!



- Greater Wall Thickness Throughout—for Increased Structural Strength.
- *Extra* Thickness in Critical Areas—for Greater Allowance Against Corrosion and Erosion.

PROMPT DELIVERIES! Wire or write for information and prices on your alloy welding fittings today!

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Since 1916 . . . Pioneers in
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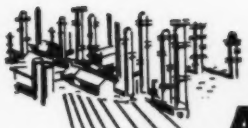
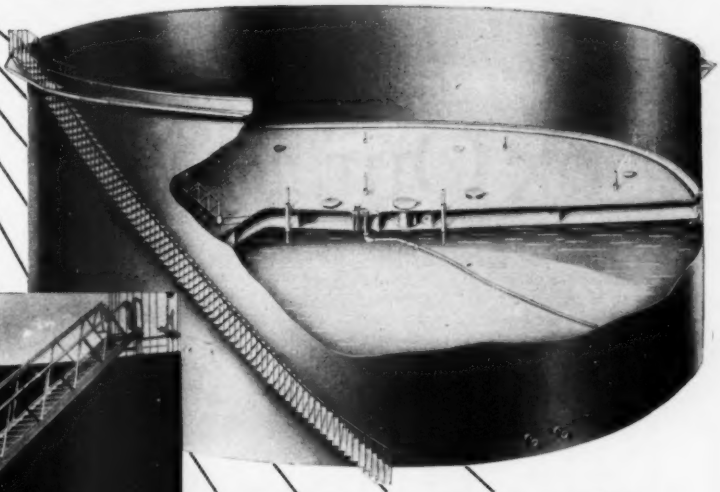


A GRAVER EXCLUSIVE



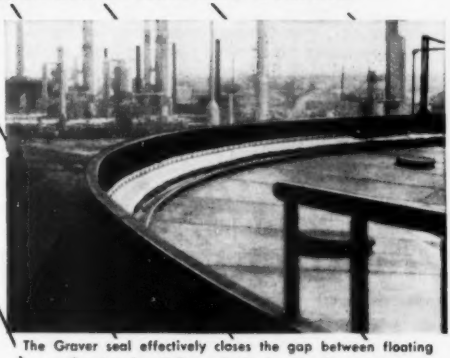
GRAVER DOUBLE-DECK FLOATING ROOF TANK

FOR CORROSION-FREE...VAPOR-TIGHT STORAGE OF CRUDES AND GASOLINES

The Graver Double-Deck Floating Roof is designed to meet the specific needs of refineries where crude is stored in quantity . . . and of terminals where the through-put of gasoline is large and almost continuous.

Because this heavy-duty roof is everywhere in contact with the liquids in storage, it eliminates the air pockets where crude and air combine to cause corrosion. Similarly, in the storage of gasolines, no filling losses are possible since there are no places for the vapor to form.

Graver's Double-Deck Floating Roof has built an impressive record of efficient operation in the services for which it was specially designed. Send for new illustrated book.



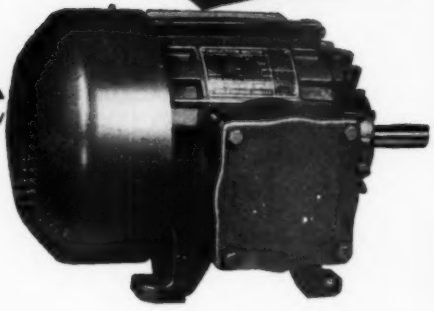
The Graver seal effectively closes the gap between floating roof and tank wall. Dependable, durable, fire-resistant.

GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

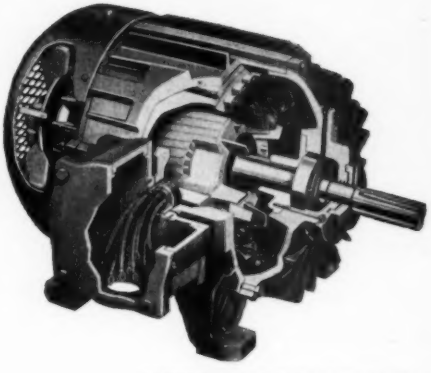
NEW YORK · CHICAGO · PHILADELPHIA · WASHINGTON
DETROIT · CINCINNATI · CATASAUQUA, PA.
HOUSTON · SAND SPRINGS, OKLA.

Look Outside



Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high. There are no enclosed external air passages to clog and cause overheating. If oily dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can easily be kept clean and cool-running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Deep rabbet fits between frame and end shield; heavy ribbing and long flame seals on shaft more than meet Underwriters' label requirements for Class I, Group D and Class II, Groups F and G locations.

See WHY THIS IS YOUR BEST MOTOR BUY

HERE IS AN EXPLOSION-PROOF MOTOR that is different from conventional explosion-proof motors; built with an entirely different cooling system that gives you big savings in lower maintenance costs, more continuous service and less trouble in toughest locations. Clogging can easily be prevented in the Allis-Chalmers Type APZZ explosion-proof motor since areas that might collect dirt are exposed and easy to clean. And, of course, it's ideal for outdoor installations.

GET DETAILS NOW — *Ask your nearby Allis-Chalmers Authorized Distributor or District Office for more complete information on this high performance explosion-proof motor. Or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7200.*

A-3579

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS AC

Rope that Sticks With You

We think of the world as a pretty big place, yet one distributor alone has sold enough Bethlehem wire rope to girdle the globe several times. And this total, impressive though it is, represents only a fraction of all the Bethlehem rope sold through the years.

This, we think, is the best possible evidence of a product sound in quality, sound in performance. Bethlehem rope has been approved by a jury of users far too vast to number — men fully qualified to pick and choose. They could, if they wished, buy other makes of rope. But they stick with the Bethlehem brand because it sticks with them.

It gives them every penny's worth of value for the hard cash they spend.

If you yourself are a user of Bethlehem rope, we don't have to tell you much about it. If you aren't, we hope you'll soon try some of this tough, sturdy product. It will do the job you expect it to do . . . and more.

For a great many applications we strongly recommend Form-Set (preformed) wire rope. It's so easy to handle, and it now costs very little more than nonpreformed.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM

Fishtail...
Roller...
Drag...

AIRCO HARDFACE-LIFTING ADDS SUB-SURFACE TIME

More than twenty Airco Hardfacing rods are ready to help you beat today's replacement delay. Full equipment protection with Airco Hardfacing Alloys . . . for new parts and old . . . keeps you free of cut-backs, or loss of day to day production.

Parts and tools — fishtail bits . . . roller bits . . . core heads . . . wall scraper blades . . . drag type bits — stay on the job longer, even at peak production, their life extended many times with *Airco Hardfacing Alloys.*

No matter what your wear problem, it will pay you to look into Airco Hardfacing Alloys for your tools and parts. Any Airco representative will be glad to give you complete information. Write your local Airco office today or address Air Reduction Sales Company, Advertising Department, 60 East 42nd Street, New York 17, N. Y.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

• In and out of Oil Fields • Laying Pipelines
• Transporting Power and Pumping Units
• Moving Tank Trucks

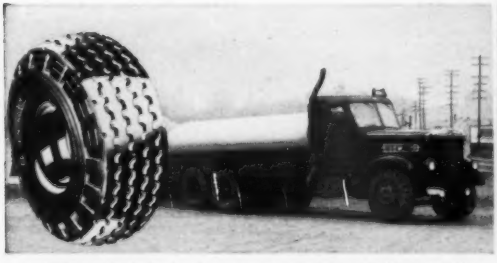
GENERALS

Do all Jobs

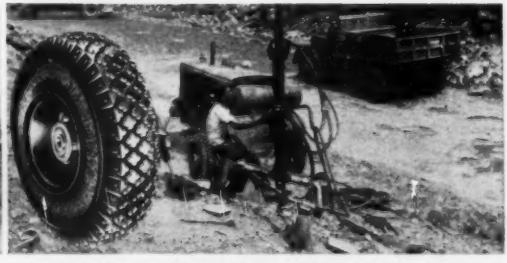
FASTER! EASIER! AT LOWER COST!

When jobs call for extra power and traction off-the-road, depend on the broad-lugged, deep-shouldered GENERAL L. C. M. Shock-absorber construction and more rayon cords per inch assure more strength, more original miles—more recap miles.

When jobs call for some work off-the-road, most on, use the GENERAL H. C. T. Extra thick saw-tooth tread for more traction, more high-speed safety. Tough shoulder cleats prevent snags, cuts, bruises. More original, more recap miles.



GENERAL C. D. Built for long runs over-the-road. More cords and more rubber for safer, lower cost miles.



WIDE-BASE GENERAL INDUSTRIAL PNEUMATICS—Rugged small tires for drilling equipment. More flotation.

REQUEST GENERAL TIRES ON YOUR NEW EQUIPMENT

Get the solid facts!

See how you save with

CHEVROLET

Advance-Design TRUCKS

Fact No. 1

PAY LESS AT THE START

Chevrolet trucks list for less than any other trucks built to handle the same payloads. Here is a real, money-in-the-bank savings on purchase price. And you'll find the Chevrolet brings you ruggedness, stamina and great truck features not found in many other trucks.

Fact No. 2

GET LOWER ON-THE-JOB COSTS

Chevrolet trucks give you Valve-in-Head economy that saves gas, four-way engine lubrication that reduces wear and saves oil, and tough, rugged construction for longer truck life. Like truck users everywhere, you'll find Chevrolet trucks cost less to own and maintain.

Fact No. 3

TRUCKS BUILT FOR YOUR PAYLOADS

Chevrolet trucks are *factory-matched* to meet your requirements. You get the right truck for the job . . . never "too much" or "too little" truck. Frame, axles, springs, body, brakes, and power form a *balanced team*.

Fact No. 4

BIGGER TRADE-IN VALUE

Records show that Chevrolet trucks traditionally bring more money at re-sale or trade-in than many other makes. Chevrolet's market value stays *up* because the value stays *in*. More reason to see your Chevrolet dealer for your best truck buy!

ADVANCE-DESIGN CHEVROLET TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

New Hook Block saves vertical derrick space, travels easily on TIMKEN® bearings

How NATIONAL SUPPLY COMPANY mounts the sheaves of its Hook Blocks on Timken bearings to assure easy turning and maximum dependability.

THE new Ideal Hook Block is a spring loaded hook and connector combined with a traveling block in one compact unit. It takes up less vertical derrick space than a conventional two-unit block and hook.

National Supply Company mounts block sheaves on rugged two-row Timken® tapered roller bearings to prevent costly breakdowns and to provide easy traveling under heavy loads. Each sheave is independently mounted and held in a fixed lateral position.

Timken bearings have extra load-carrying capacity because of line contact between rollers and races. They hold up under the heaviest shock loads.

True rolling motion of Timken bearings plus the smooth surface finish of rollers and races practically eliminate friction. Wear within the bearing is minimized. Sheaves turn freely, eliminating cable scuffing. Empty blocks fall faster.

Timken bearings keep housing and shaft concentric, make closures more effective. Lubricant stays in —dirt and moisture stay out. Maintenance is held to a minimum.

No other bearings can give you all the advantages you get with Timken bearings. Make sure you have them in the equipment you buy or build. Look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

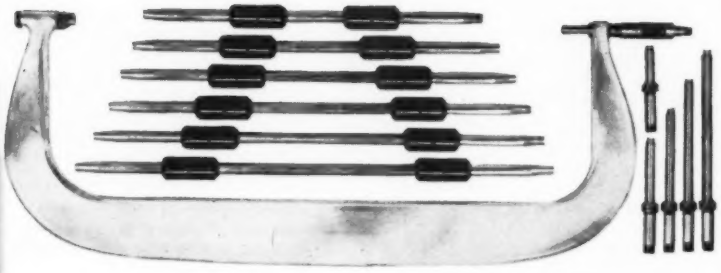
TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL AND THRUST →◫← LOADS OR ANY COMBINATION →✳←

The TUMICO Bar Micrometer



SHALLOW, TUBULAR FRAME FOR PRECISION LONG-SPAN MEASUREMENT!

The shallow frame of the Tumico Bar Micrometer slips in where frame clearance is too small for ordinary micrometers. The hollow steel frame cuts weight in half . . . makes precision measurements easy, even in the largest sizes. It is made in over 30 models ranging from 6″ to 168″. The Tumico Bar Micrometer can be furnished with either adjustable mandrels or sliding bar anvil.

All Tumico micrometers, gages and measuring instruments are fully and easily adjustable for wear. Skilled engineering has reduced weights up to 50%. "Feather touch" feel and balance speeds measurements and assures accuracy.

Tumico instruments control production for many of America's largest manufacturers. Consult us for special production gages, calipers, alignment instruments, etc. Catalog sent free on request.

TUBULAR MICROMETER CO.
ST. JAMES, MINNESOTA

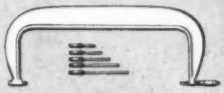
FEATHER TOUCH

SEATTLE • LOS ANGELES • DENVER • DALLAS • CHICAGO • MINNEAPOLIS • KANSAS CITY
DETROIT • ATLANTA • NEW YORK • TORONTO, CANADA • EXPORT OFFICE: CHICAGO

FOR EVERY JOB

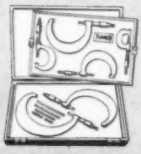
TUMICO

PRECISION MEASURING INSTRUMENTS

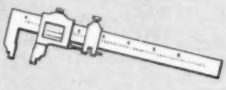


TUMICO BAR MICROMETERS
Provide a wide range of precision measurement with low investment. 30 models from 6″ to 168″.

TUMICO DIAL INDICATOR GAGES
Quick vision Tumico micrometers and gages to meet your special measurement requirements.



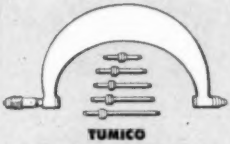
TUMICO MICROMETER SETS
Complete sets for a broad range of accurate measurement operations. From 0″ to 30″ in 1″ steps.



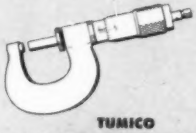
TUMICO VERNIER CALIPERS
Precision made. Accurate, clearly etched graduations and numerals. 24 models from 6″ to 48″.

TUMICO INSIDE MICROMETERS
Tubular construction; insulated from hand heat for full precision. 37 models from 1″ to 106″.

TUMICO POST GAGES
Precision micrometer or dial indicator instruments adaptable to a wide variety of uses. 10 models.



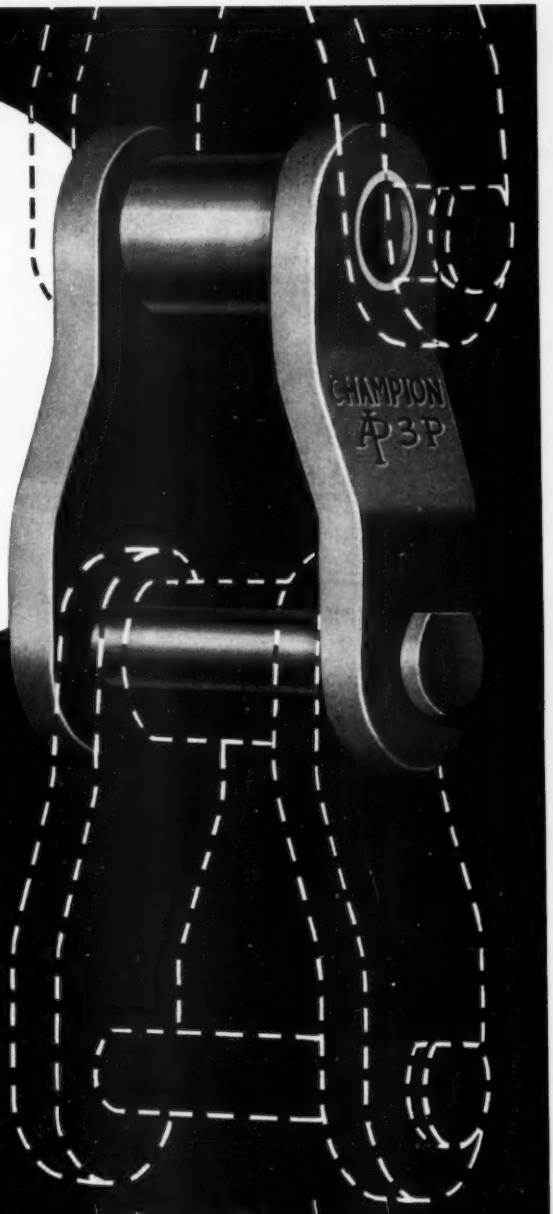
TUMICO OVER-THE-BAR MICROMETERS
Precision bore measurement without removing boring bar. 11 models from 3″ to 28″.



TUMICO HEAVY-DUTY MICROMETERS
Extra rugged for hard usage under severe conditions. 4 models from 0″ to 4″.

why you're always right with

REX®



the REX UNIT LINK *for example..*

Assures longer chain life because motion is confined to the hardened wearing parts which are designed to take it.

For all the facts, write for Bulletin 51-8

REX API CHAINS

"for 40 years the greatest chains that ever hit the oil fields"

CHAIN BELT REX COMPANY ®

Chain Belt COMPANY
OF MILWAUKEE

4619 W. Greenfield Ave., Milwaukee 1, Wis.

OIL FIELD SALES OFFICES

New York • Tulsa • Dallas • Houston • Midland • Los Angeles

Distributors located in principal cities in the United States and throughout the world

Export Offices: Milwaukee and 19 Rector St., New York City

McKee builds the plants that produce them

IT'S virtually impossible to find a place where steel is used without the use of some petroleum product in its production, fabrication or operation. It is just as hard to name a use for gasoline or oil without steel in the picture.

Steel and Oil—these are industry's "inseparables" and they are needed today in greater quantities than ever before.

The McKee organization has designed and built hundreds of plants in the United States and some 25 foreign countries and is now engineering new facilities which will account for a definite increase in the production of iron and steel and petroleum products.

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

McKee Engineering

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio.
New York Office: 30 Rockefeller Plaza, New York 20, N.Y. • *Washington Office:* 1507 M Street, N. W. Washington, D. C. • *England:* The Iron and Steel Division of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd.
District Engineering Offices: Union, New Jersey and Tulsa, Oklahoma

hallicrafters

new, powerful 2-way FM radio-telephone!

the *littlefone*®

SERVES HUNDREDS OF OIL INDUSTRY'S VITAL NEEDS FOR DEPENDABLE, PORTABLE COMMUNICATIONS

HAND CARRY

HT-21 (25-50 Mc.)
HT-22 (150-174 Mc.)

- FULL TWO-WATT ANTENNA OUTPUT*
- Weighs only 14 pounds!
- Complete, self-contained 2-way radio-telephone station!
- Powered by Dry, or Wet Rechargeable Batteries (can be recharged from car battery or 117 Volts AC)
- Rugged, weatherproof
- 22 sub-miniature tubes!

*On 25-50 Mc. • One-Watt output on 150-174 Mc. 10-Pound, Lower Powered Models Also Available

CENTRAL STATION

HT-23 (25-50 Mc.) HT-24 (150-174 Mc.)

Same performance and specifications as the "Littlefone" Hand Carry.

- AC-operated Central Station
- Audio-amplifier, providing one watt of audio for loudspeaker
- Power consumption is 35 watts
- Plugs in any AC outlet (117 Volts)

Where one or more extra stationary receiving stations are desired, Hallicrafters economical S-81 receivers may be added.

A new, versatile, low-cost radiophone to serve all phases of Oil Industry communications. Scores of uses: between deployed units of geophysical crews, pipe line spreads, driller-toolpusher-contractor stores, mobile units in refineries, terminals and field processing plants.

USES OF "LITTLEFONE" CHALLENGE YOUR IMAGINATION!

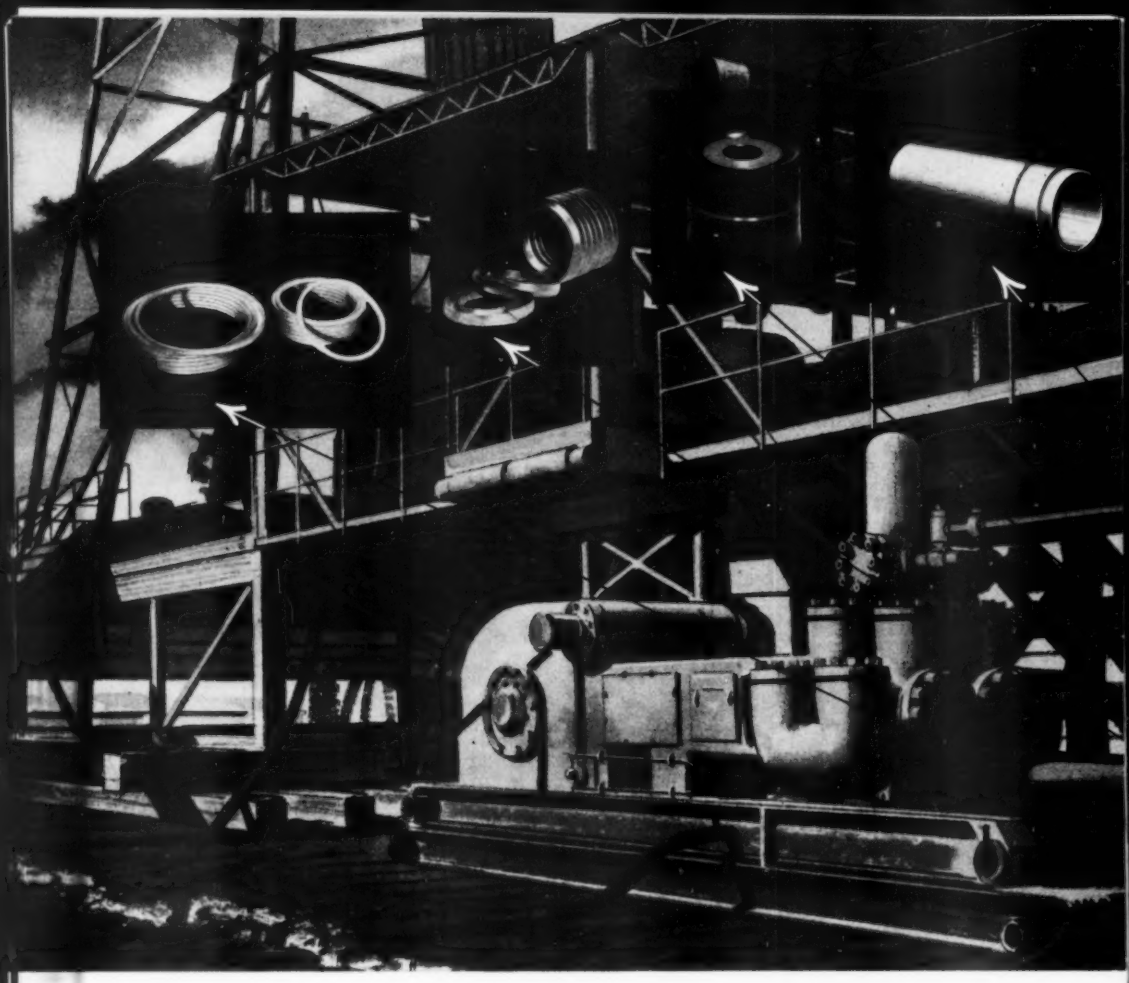
There are literally thousands of industrial uses for the "*littlefone*" radio—anywhere where powerful, dependable, "on the move" contact is required.

SAVES TIME AND MONEY IN SUCH OIL OPERATIONS AS:

- RIVER CROSSINGS
- FIRE FIGHTING
- COORDINATION AND DIRECTION OF MOBILE UNITS
- TANK GAUGING REPORTS
- PRODUCING LEASE REPORTS
- CASUALTY REPORTS
- EMERGENCY DRILLING
- EXPANDING RADIO NETWORKS
- PIPE LINE AIR PATROL (PLANE TO GROUND)
- OFF-SHORE DRILLING
- STANDBY EMERGENCY COMMUNICATIONS

hallicrafters
"The Radio Man's Radio"

World's Leading Manufacturer of *Precision* Radio and Television — Chicago 24



for maximum slush pump efficiency . . . .

A good preventive maintenance program on slush pumps attains its maximum effectiveness when "Ideal" Fluid End Parts are specified because these parts are the products of National Supply—experienced manufacturer of slush pumps and pump parts for more than 35 years.

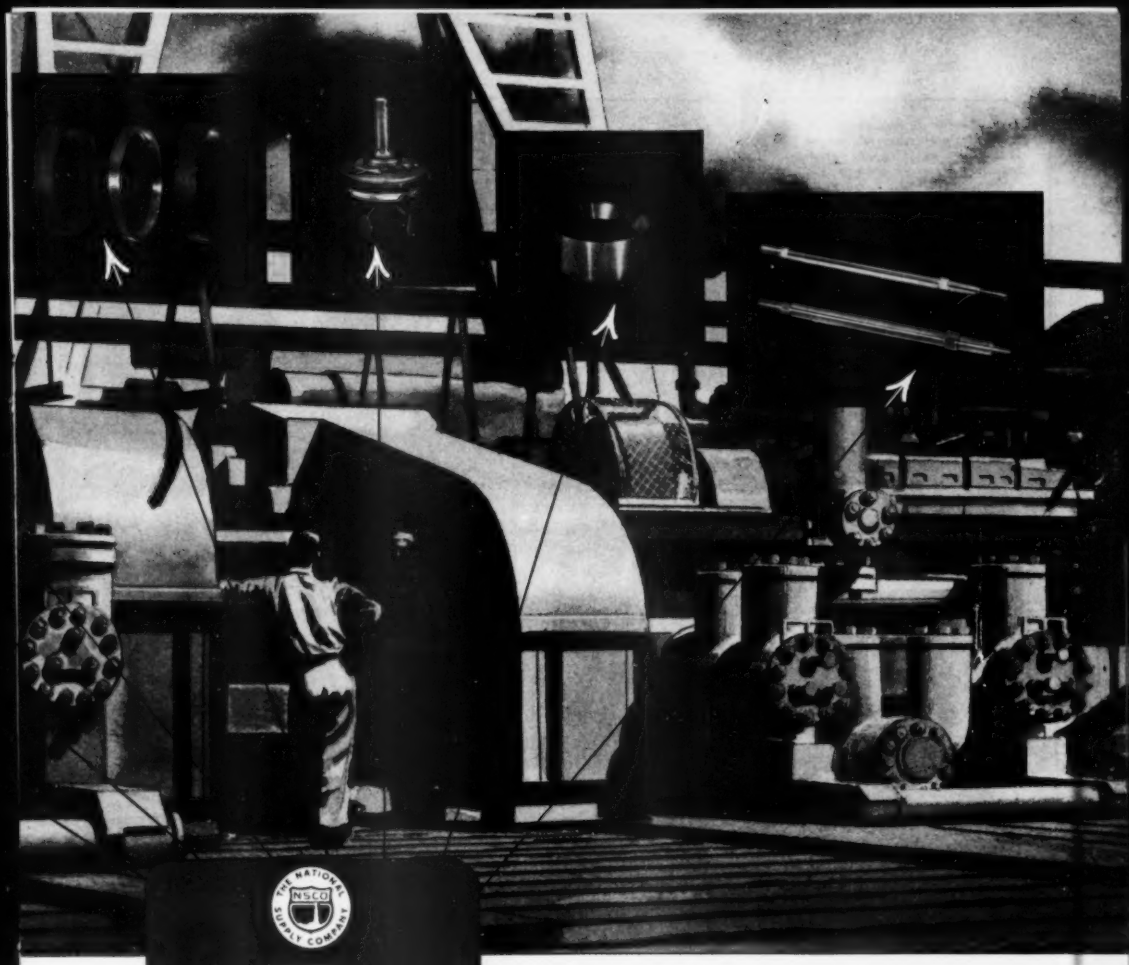
Thus, the continuing research and development program on materials and methods for improving slush pump performance, carried on by National Supply engineers, is reflected in parallel improvement of fluid end parts to obtain maximum mud volume and velocity from each pump.

Of like importance are three additional facts about "Ideal" Fluid End Parts—

- **They're carried in stock at National Supply Stores in the United States and Canada.**
- **They're obtainable in every major oil field throughout the world through the Export Division of National Supply.**
- **They're available for use on pumps of other makes, as well as for "Ideal" Slush Pumps.**

You'll find it worthwhile to specify "Ideal" Fluid End Parts to maintain maximum slush pump efficiency at minimum cost through effective preventive maintenance.

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT



IDEAL

use FLUID END PARTS in slush pump maintenance

FOR SLUSH PUMPS

THE NATIONAL SUPPLY COMPANY
TOLEDO, OHIO U.S.A.

NATIONAL BLUE PRODUCTS

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO

DIVISION OFFICES: Casper; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance
CANADA: The National Supply Company, Limited, 702 Barron Bldg., 610 Eighth Ave., West, Calgary, Alberta
EXPORT: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London, E. C. 2

SPANG STEEL PIPE • SUPERIOR AND ATLAS ENGINES

up and up and up go Harvey Columns

Fabricated in London, erected in Holland, another Harvey Flash Fractionating Column takes its place in the vast new Royal Dutch Shell Refinery, at Pernis, where present day world demand for Oil and all its products is rapidly being met. Harveys were able to undertake this work because they have one of the most modern and completely equipped works in the world—operated by an experienced staff specialising in this and other types of fabrication for the Oil and many other Industries. **In fact Yours the problem – Harveys the answer!**

FABRICATORS **Harvey** **IN METAL**

G. A. Harvey & Co. (London) Ltd. Woolwich Road, London, S.E.7

NOW—Simpler, Faster, Automatic Titrations!

Here's another new Beckman advancement in instrumentation—*an instrument that runs your titrations for you.* It's the Beckman Automatic Titrator—the instrument that makes accurate titrations more rapidly and conveniently than by manual methods.

SIMPLE OPERATION: In a series of titrations, simply fill the burette, place the sample in the beaker—and the Beckman Automatic Titrator takes over from there. Raising the beaker holder into position automatically starts the stirrer motor and begins delivering titrating solution into the sample.

A special circuit electrically anticipates the approaching end point, scaling down delivery of the titrating solution in progressively smaller increments to assure a highly accurate titration. When the end point is reached, delivery of the titrating solution stops and a light shows completion of the titration—*all automatically and without attention from the operator.*

Whether your laboratory is large or small the Beckman Automatic Titrator provides important advantages in your titrating operations . . .

- *It releases the technician during titration, enabling him to perform other operations such as preparing samples, or calculating results.*
- *It eliminates the fatigue caused by close observation required in manual procedures.*
- *It gives objective, reproducible results . . . eliminates errors due to personal factors.*
- *It provides time-saving conveniences for sample handling.*

PERFORMS A WIDE VARIETY OF TITRATIONS—Neutralization, **Oxidation-Reduction**, Precipitation, **Complex-Formation** and other types.

NO SPECIAL TRAINING IS REQUIRED—rapid and accurate titrations can readily be performed without special skill or technique.

QUICK, SIMPLE OPERATION—completes many routine titrations in only 1-1½ minutes—even titrations to 0.1% accuracy in 2½ minutes or less. Change of sample is simple, rapid—a single motion raises, locates and secures new sample in operating position.

CONVENIENT, VERSATILE, ADAPTABLE—0° to 100° C temperature compensation . . . adjustable holder accommodates 10 ml to 400 ml beakers or similar vessels . . . instrument may be used with all standard burettes down to 5 ml . . . as many as four delivery units accommodated by single amplifier control unit. . . . uses standard Beckman electrodes . . . electrode holders and delivery tip can be pivoted into any required position . . . ample provision for mounting heating devices or other special equipment.

ALSO A RELIABLE pH METER—the Beckman Automatic Titrator can also be used as an AC-powered pH meter to give accurate readings over the range 0 to 14 pH, as well as millivolt readings from −600 to +1400 mv.

For full details on this new Beckman instrument see your authorized Beckman dealer—or write direct. *Beckman Instruments, National Technical Laboratories, South Pasadena Z24, California.*

Factory Service Branches:
NEW YORK — CHICAGO — LOS ANGELES

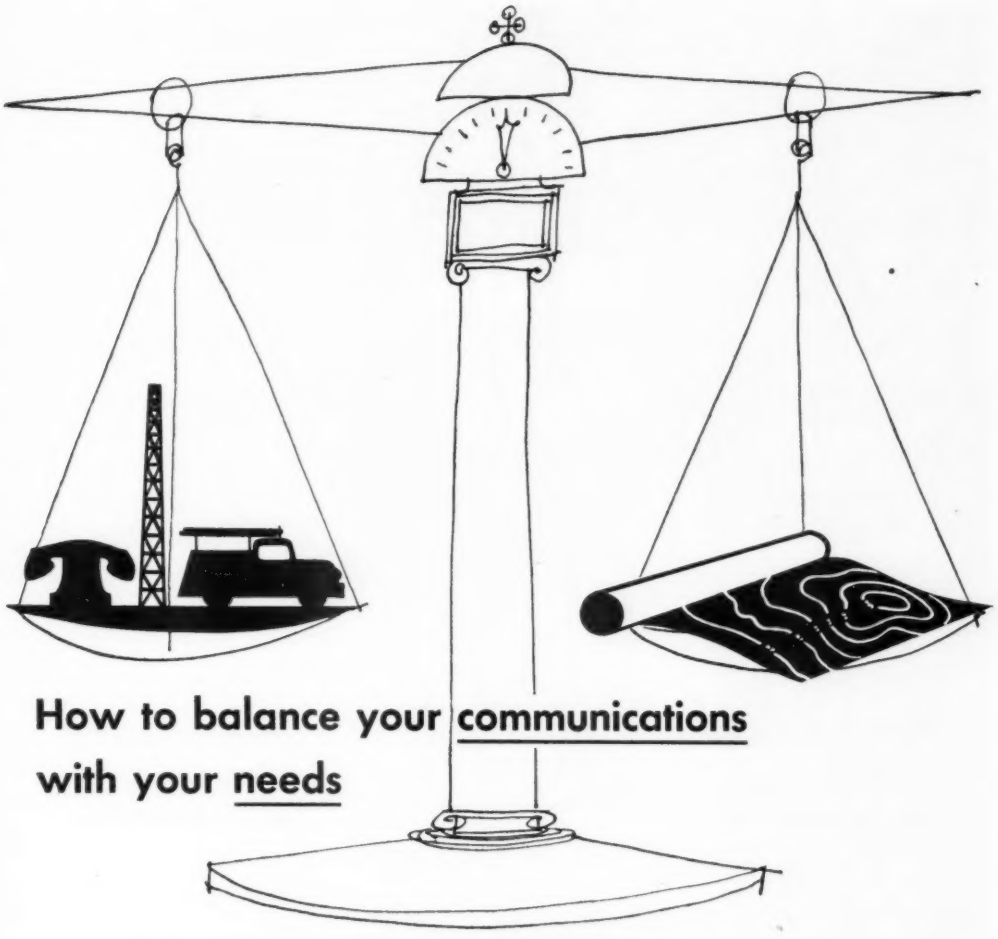
BECKMAN INSTRUMENTS
control modern industries

Beckman Instruments include: pH Meters and Electrodes — Spectrophotometers — Radioactivity Meters — Special Instruments

It lighted our lamps
it now powers the world

F*rom first*
experiments
in 1913
to world-wide
service
in 1952,
Schlumberger
developments
have kept
pace with
the industry.

S c h l u m b e r g e r



How to balance your communications with your needs

Every pipeline has its own individual communications requirement. Any less is unsatisfactory. Any more is wasteful.

The Bell System can provide exact amounts of communications service—*no less*, and *no more* than you should have. If your communications needs increase, we can expand your service accordingly. If your needs decrease, we can trim your service to fit.

Net result: *good*, *flexible*, efficient communications for the job at all times.

The Bell System places all forms of communications at your service—using microwave radio, wire or cable. In every case, we have matchless experience to back up our equipment.

•

Your Bell Telephone Company will be glad to study your communications problems and needs without charge.

PRIVATE-LINE TELEPHONE

TELETYPEWRITER

MOBILE TELEPHONE

METERING CHANNELS

BELL TELEPHONE SYSTEM

TWO DEPENDABLE, CONSISTENT MATERIALS...

Tops in the field

...for lightening cement slurries

...for restoring lost circulation

with excellent bridging effectiveness...

Strata-Crete* the lightweight, processed perlite aggregate not only permits higher columns at lower pressures... but also bars loss of cement slurry... greatly reduces perforation cracking or shattering.

with excellent bridging qualities...

Strata-Seal* has *proved* its superiorities in well after well... chemically inert, is not affected by mud or heat... permits screening... cuts rig downtime... often saves abandonment.

*Trade Mark GLCC

STRATA-CRETE SALES
GREAT LAKES CARBON CORPORATION
5845 Atlantic Ave., Long Beach 5, Calif.
Offices in Principal Oil Centers
In the States of Texas, Louisiana, Oklahoma, Kansas and New Mexico Strata-Crete and Strata-Seal are available only through Great Lakes Corporation, Long Beach 5, Calif.

Packed in 4 cu. ft. bags. Available through Leading Oil Well Cementing Concerns; Leading Mud Service Companies. Write for more data.

They Say—

Too-Low Prices, Too-High Taxes

"If we are to believe the Bureau of Labor statistics, today's price for crude to be on a parity with all other commodities, exclusive of farm products, as of September 11, 1951, should be $3.22 per barrel for 40°-gravity Mid-Continent crude, up 57 cents from today's price.

"Only competition in a free market can dictate a realistic price level, one that presumably will take into account current visible supply and anticipated future demand.

"This means eliminating petroleum and its products from price control.

"Industry economists have figured that the reduction of the depletion percentage figure from 27½ to 15 cent (as last proposed by the Treasury) would make it necessary for the industry to find $250 million more, annually, for capital investments in after-taxes revenues or in borrowed money.

"If you will turn this around, you will see that the total revenue that the government hopes to capture by reducing the depletion provision to 15 per cent cannot exceed $250 million, which is considerably less than ½ to 1 per cent of this year's budget.

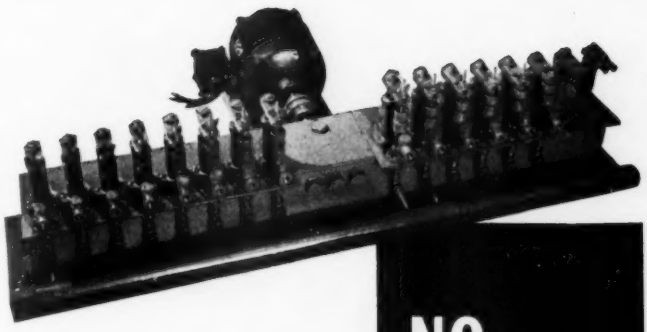
"Would it occur to you gentlemen, as business men, to cripple or perhaps destroy the third largest industry in the United States, an industry that pays $3½ billion in taxes annually, in order to increase revenues temporarily by ½ of 1 per cent, unless you had in mind some motive other than fund raising?"

Robert F. Windfohr, president, Texas Mid-Continent Oil and Gas Association, speaking in Houston.

Economic Suicide?

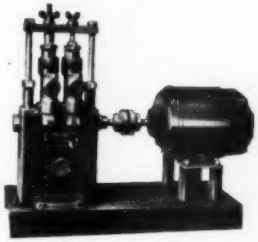
"We think that if we had moved in time we could have stopped the business of floating natural gas away from a fuel-starved region to Illinois, Indiana, Ohio, and Pennsylvania, which is in the heart of the cheap coal producing section of the United States. It may be said on the other side that we also have coal in Kansas and Oklahoma, and that all four states have oil. But our coal is expensive compared to the thick veins in the North, and petroleum is fast becoming too superior a commodity to be burned in furnaces.

"Probably half the natural gas in the four-state area is now being exported to the coal-rich North and East. In 1948 Texas was exporting 27 per cent of its gas, Louisiana and Oklahoma 43 per cent and Kansas 75 per cent. These export proportions are greater today because new interstate pipe lines are being attached



MULTI-FEED CHEMICAL FEEDERS

Manzel flexibility permits *accurate* feeding of *many* different chemicals simultaneously. Chemicals can be pumped *into* other liquids or test samples drawn from production at regular intervals. Easily synchronized with any process. Supremely accurate proportional feeding. Any number of feeds, any type of drive.



LARGE OR SMALL CAPACITIES

Manzel Chemical Feeders pump from a fraction of a drop to 60 gph per feed...with *unsurpassed accuracy and dependability.* You eliminate troubles due to guesswork, inaccuracy, or forgetfulness.

Despite their time-tested dependability, Manzel Chemical Feeders are priced much lower than you might expect. They can be individually engineered for *any* application. Write for details today.

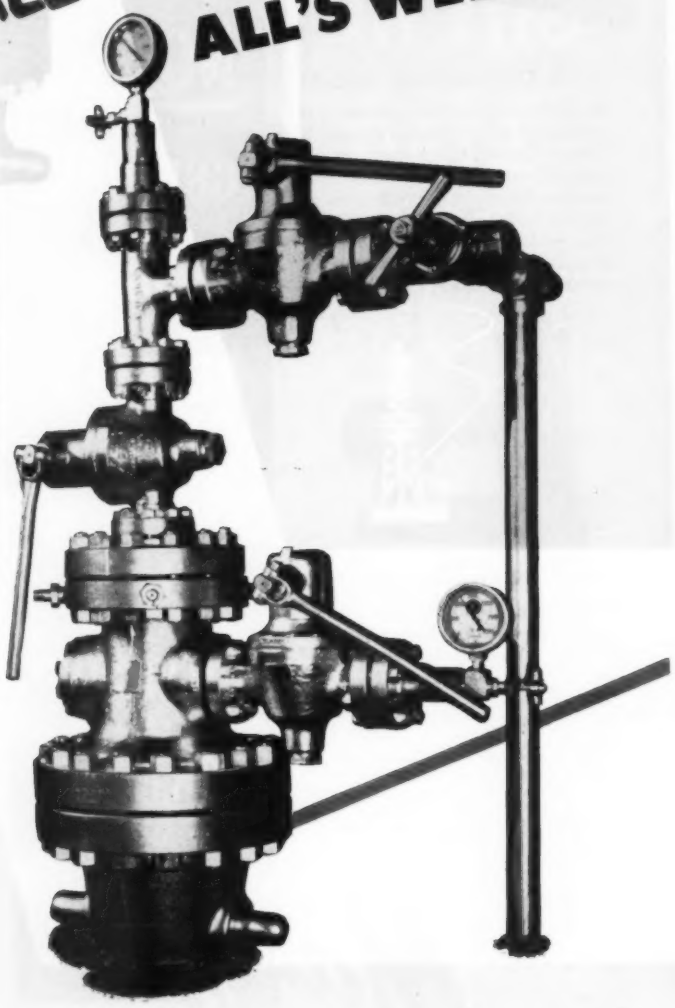
NO CHEMICAL FEEDING PROBLEM IS TOO DIFFICULT FOR

Manzel

336 Babcock St.
Buffalo 10, N. Y.

Specializing in High Pressure Metering Pumps since 1898

ALL-CAMERON
ALL-FORGED STEEL
ALL'S WELL!



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to the wells at this very moment.

"Tomorrow the ratio may be heavily against us and we may have a gas shortage at home, while still shipping it out in clouds.

"We are aware of the difficulty of establishing by law the superiority or even the priority of use for anything in America.

"But we continue to be impressed by the foolishness of coalless Texas, particularly, sending its precious natural gas straight through the coal belt of Illinois to Chicago and getting only 3, 4, or 5 cents per thousand cubic feet for it at the wellhead when a little more conservation would have brought it 10, 11, and 12 cents further down the line from the chemical industry on its Gulf coast. We think it would have been possible in this country to get a law by common consent to prevent a whole economic region from committing suicide. We regret it wasn't tried in time."

Editorial in Tulsa Tribune.

CALENDAR

February

First International Conference on Underground Gasification of Coal, Birmingham and Gorgas, Ala., February 12-14.

American Petroleum Institute, Division of Marketing, lubrication-committee meeting, Hotel Book-Cadillac, Detroit, February 18-19.

American Institute of Mining and Metallurgical Engineers, annual all-institute meeting, including petroleum branch, Statler Hotel, New York City, February 18-21.

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, annual meeting, Salt Lake City, February 28-29.

Natural Gasoline Association of America, Permian-Basin regional meeting, Lincoln Hotel, Odessa, Tex., February 29.

March

Manufacturers Standardization Society of Valve and Fittings Industry, annual meeting, Hotel Commodore, New York City, March 3-5.

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.

Pacific Coast Gas Association, annual technical services conference, Fresno, Calif., March 5-6.

American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

Illinois Petroleum Marketers Association, annual convention, Hotel Sherman, Chicago, March 11-13.

Texas Oil Jobbers Association, Inc., annual spring convention and refiners and suppliers exhibit, Hotel Adolphus, Dallas, March 12-13.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 18-20.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 19-21.

American Association of Petroleum Geol-

ogists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Biltmore Hotel, Los Angeles, March 23-27.

Texas Independent Producers and Royalty Owners Association, sixth annual meeting, Fort Worth, March 27-28.

North Texas Oil and Gas Association, twenty-second annual meeting, Kemp Hotel, Wichita Falls, Tex., March 29.

Western Petroleum Refiners Association annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

Mid-West Gas Association, annual meeting, Hotel Radisson, Minneapolis, Minn., March 31-April 2.

American Chemical Society, division of petroleum chemistry, annual meeting, Milwaukee, March 31-April 3.

April

Pacific Coast Gas Association, annual transmission conference, Berkeley, Calif., April 2-3.

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

Florida-Georgia Gas Association, annual convention, Soreno Hotel, Saint Petersburg, April 3-5.

Missouri Liquefied Petroleum Gas Association, Hotel President, Kansas City, Mo., April 7-9.

American Society of Lubrication Engineers, annual meeting, Statler Hotel, Cleveland, April 7-9.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 8-10.

Arizona Geological Society of America, forty-eighth annual meeting, University of Arizona campus, Tucson, Ariz., April 11-12.

Petroleum Industry Electrical Association and Petroleum Electrical Supply Association, twenty-fourth annual joint conference, Mayo Hotel, Tulsa, April 14-17.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland, April 16-18.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, safety and fire-protection committees, Hotel Texas, Fort Worth, April 21-24.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

Indiana Gas Association, annual meeting, French Lick Springs Hotel, French Lick, Ind., April 24-25.

Independent Petroleum Association of America, midyear meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 28-29.

Southern Gas Association, annual convention, Galveston, Tex., April 28-30.

American Oil Chemists' Society, spring meeting, Shamrock Hotel, Houston, April 28-30.

American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.

Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 2.

May

Southeastern Section Geological Society of America, and Southeastern Mineral Symposium, joint meeting, Hotel Roanoke, Roanoke, Va., May 1-3.

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.

Interstate Oil Compact Commission, spring meeting, Phoenix, Ariz., May 8-9.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

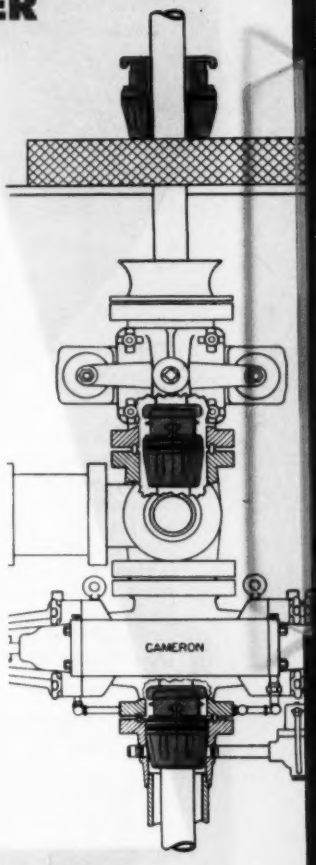
American Association of Petroleum Geologists, regional meeting, Mayo Hotel, Tulsa, May 12-13.

American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

Annual Liquefied Petroleum Gas Associa-

LATCH AND DROP
IT SETS AND SEALS AUTOMATICALLY

The Cameron Type "A" (for automatic) CASING HANGER



Above — Cutaway view of the Cameron Type "A" Hanger seated in the casing head. Note wedges in the slips which travel inward and upward upon contact with the casing head, thus exerting sealing compression on the packing ring the instant pipe is suspended. With the hanger seated in the casing head, the preventers may be lifted without danger from pressure between strings.

Right — A schematic diagram showing how the Type "A" Slip Assembly may be dropped (or lowered) through the drilling control assembly.

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tion convention and trade show, Palmer House, Chicago, May 12-14.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

Pennsylvania Gas Association, Wernersville, Pa., May 13-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute; division of marketing, midyear meeting, Copley Plaza, Boston, May 18-19.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston, May 29-30.

Seventh annual short course in gas technology, sponsored by the Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex., May 29-31.

June

Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J., June 1-6.

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

Western Petroleum Refiners Association, regional technical and industrial-relations meeting, Broadview Hotel, Wichita, Kans., June 12-13.

International Gas Conference, Brussels, Belgium, June 16-22.

Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky., June 19-20.

Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco, June 22-25.

Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich., June 23-24.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis, Minn., June 23-27.

August

Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco, August 11-13.

American Institute of Electrical Engineers, Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz., August 19-22.

September

Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, September 3-5.

National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J., September 10-12.

American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago, September 11-13.

Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo., September 25-26.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club. Annual inaugural ball, Embassy Room, Ambassador Hotel, February 16.

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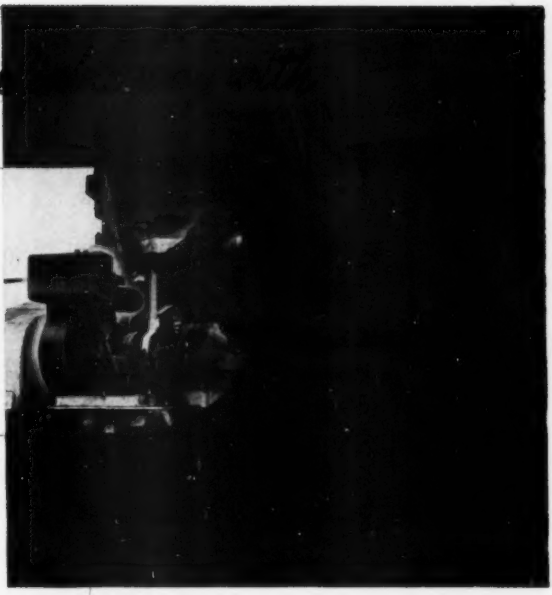

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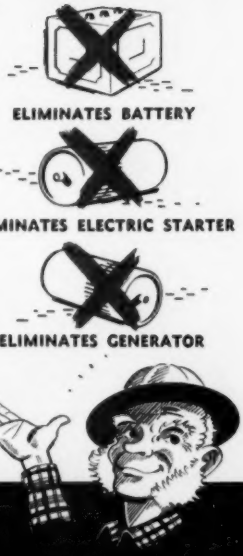

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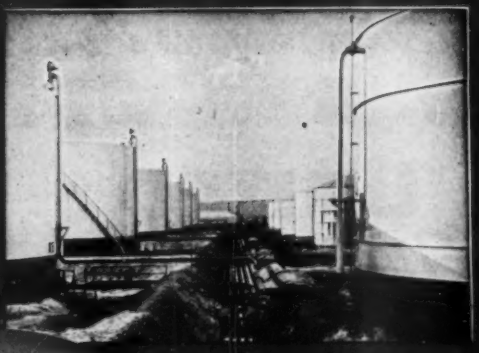

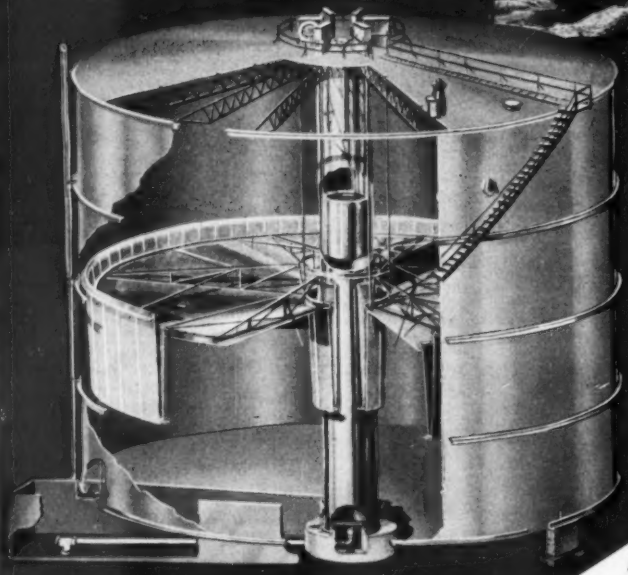

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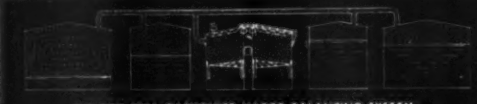

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JOURNALLY Speaking

Good Management

WHAT constitutes a well-run company? The American Institute of Management studies 3,000 firms every year and grades them on a point-score system which evaluates 10 separate fields—economic function, corporate structure, health of earnings, growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor, and executive evaluation.

Last year the institute awarded "Certificates of Management Excellence" to 298 companies in the United States and Canada, and it is interesting to note that these oil companies made the grade: Continental, Humble, Gulf, Socony-Vacuum, Jersey Standard, Ohio Oil, Phillips, Standard of Cal., Indiana Standard, Standard of Ohio, and Sun.

"It is heartening to note," said the institute, "that 70 more firms are receiving awards this year than did a year ago. This proves that companies are tightening up on their methods and procedures and improving their relations with employes, stockholders, and the public. One of the purposes of these awards is to encourage management in all lines of business to give due weight to all 10 factors, rather than being especially strong in one or two and neglecting the others."

And it is heartening to us to note that quite a group of the oil industry's biggest outfits are among the elite of the firms who qualified as being well run 10 different ways.

Drake's Legacy

WHEN "Col." Edwin L. Drake drilled the world's first commercial oil well near Titusville, Pa., in 1850, he didn't know much about petroleum and neither did anyone else, but now the business of studying petroleum has become a right sizable activity. To increase this studying and also to honor the man who really, though unknowingly, started it all, there is now a Drake Scholarship Fund at the School of Mineral Industries at Pennsylvania State College, not far from the spot where the first well was drilled.

The donor of the Drake scholarship is John P. Herrick, of Olean, N. Y., a civic-minded and appreciative member of the oil industry, who has been an oil producer himself for more than 40 years and is a charter member of the American Petroleum Institute, Pennsylvania Grade Crude Oil Association, and New York State Oil Producers Association. Not only that, but he has been a school teacher, publisher of newspapers in the Appalachian oil region, author of the book "Empire Oil," and prominent in the real estate, banking, and insurance businesses. Herrick has established many other scholarships in various colleges, many of them in journalism (which, we can testify, is also a field where knowledge is valuable), but his latest benevolence in assisting students of petroleum in the name of Drake is particularly appropriate.

It Happened Last Year

EVER have this experience? You remember having read a darn good article on some phase of the oil or gas business and you want to refer to it again but can't recall just when or where you saw it. Naturally, of course, you assume that it must have been in our favorite oil publication. So you reach for the stack of Big Yellow Books you always keep within arm's reach and thumb through several but there are so many good articles on so many pertinent subjects that you can't find what you're looking for in a hurry.

What you need is our Annual Index. The 1951 edition is on the press now—a separate pamphlet of the same page size as a weekly Journal. It lists all the articles and editorial features of the 52 issues by title and author.

We don't send copies to every subscriber automatically because so many of our readers clip their Journals every week, file everything they are going to need for future reference, and make up their own indexes (indicies, if you insist). But a lot of others keep all copies intact, and for them our annual index is a mighty handy thing to have around the office. Copies are free, and you can have one for the asking. But write in right now, because they usually go like hot cakes.

—Henry D. Ralph

NICKEL ALLOY IRONS
develop improved properties
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PLAIN GRAY IRON is, structurally, a steel matrix containing graphite flakes. Engineering, physical, processing and service properties are wholly dependent upon the character and disposition of these flakes, and upon the nature of the matrix.

The matrix of nickel alloyed irons closely resembles the pearlitic matrix found in high carbon steels, whereas the matrix of ordinary plain iron resembles that found in low carbon steels. Compositions of nickel alloy irons can be adjusted to reduce "chill" in thin sections without risk of forming "spongy" regions in heavy sections. This promotes uniform strength, improved machinability, pressure tightness and wear resistance.

Hardness in nickel cast irons results from improvement of the matrix. Chilled areas and hard carbides, which impair machinability, are obviated. Nickel improves response to heat treating. In fact, use of nickel alone or with other alloying elements plays an important part in meeting a variety of requirements.

Accordingly . . . nickel alloyed irons permit production of castings with high levels of the following properties:

Strength

Tensile and transverse strengths of castings are greatly increased by the addition of nickel to cast irons of properly adjusted base mixture. The ratio of compressive strength to tensile strength is retained. Greater uniformity of strength in thick and thin sections is achieved.

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Elasticity

The elastic modulus increases with strength. In this respect nickel-containing irons of the high strength type possess good stiffness and do not deform permanently under loads that would be damaging to irons of lower elastic modulus.

Damping Capacity

The damping capacity inherent in gray cast iron is not impaired by the presence of nickel.

Wear Resistance

The uniformly pearlitic matrix of nickel cast irons appreciably improves wear resistance. The uniformly fine graphite flake distribution, achieved in suitably processed irons *without formation of a poor wearing dendritic condition,* affords optimum resistance to wear and galling.

Pressure Tightness

Characterized by dense grain structure and fine dispersion of graphite throughout, nickel alloy irons are close-grained and offer an extraordinary degree of pressure tightness under high hydrostatic pressures, without sacrificing machinability.

Applications

Heavy machinery frames and *beds* are typical of cast parts that benefit from the rigidity and good damping capacity of nickel cast irons. *Cylinder* and *pump liners, gears, dies, machine tool ways, saddles* and *tables* exemplify parts produced in nickel irons to assure greatly increased strength and wear resistance. And nickel alloyed iron is used for *heavy duty brake drums* to resist heat checking, thermal shock, wear and galling. The nickel cast irons are readily heat treated, and respond particularly well to flame and induction hardening.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of engineering nickel cast irons for many end uses in defense and defense supporting industries.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

the OIL AND GAS JOURNAL

February 11, 1952

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IT TAKES MORE THAN MUSCLE

Watching an athlete top a sports record, you feel a glow of admiration for the high degree of control and coordination which he has over his well trained muscles. And in oil well casing perforating, the same as in sports, it is the effectiveness of the techniques developed and the skill in applying them that get results. Welex Jet perforating, unlike the older methods which it is replacing, is not a method of violently upsetting an assembly in the well to permit the entry of oil. Rather it is *formation* perforating, which produces *through an intact assembly* with *positive hole density per foot* and *known penetration*. Results cost less with Welex Jets. Call your nearest Welex Station for prompt service day or night.

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Will we have plenty of oil or a "stabilized" shortage?

IT has now become quite clear that the Office of Price Stabilization is not a bit interested in getting enough oil in the right places at the right times. It is concerned solely with its own idea of "stabilization"—which means sticking to a rigid price schedule even though it creates artificial shortages.

Three events of the past week have shown up OPS in its true colors:

- New England is in grave danger of running short of home-heating oil and other distillates because tanker rates have gone up so much that the industry can't afford to bring in supplies at present ceiling prices. A price increase of ½ cent a gallon would cure the shortage. But OPS said that would be inflation, and proposed a government subsidy.
- Our Navy can't get enough "Navy special" fuel oil because it costs most refiners about $2.50 a barrel to make it. But OPS refuses to budge its ceiling price of $2.10. So the Navy is buying a distillate cut to blend with heavy fuel and will end up paying around $3.00 a barrel.
- Bunker fuel is so short at most United States ports that many ships are being delayed in sailing. Bunker fuel is a drug on the market at many inland refineries but the port price is so low it doesn't pay to ship it. A moderate price increase would bring out additional supplies, but OPS prefers stabilization.

THAT'S the pattern OPS is setting for petroleum prices—arbitrary, inflexible, unrealistic. It bothers OPS not at all that its policy causes shortages where no shortages are necessary. The agency seems obsessed with stubborn adherence to a dogmatic notion that the nation's welfare depends solely on a figure on a price-index chart.

The entire oil industry is thus put on notice that it can expect no sympathy from OPS in any other situation where a moderate price adjustment would produce the supplies needed to prevent a shortage.

Oil must have a flexible market. One big reason why consumers have always had petroleum products at the times, places, quantities, and specifications needed is that prices have been sufficiently flexible to encourage the necessary adjustments in manufacture and distribution. The OPS strait jacket has ended its ability to serve its customers.

THE fate of all future attempts to secure increases in the ceiling prices of crude or products can be foretold by OPS' most recent actions. If the nation is going to have the oil supplies it needs, OPS must be jarred loose from the fallacy that stabilization means rigidity.

The present price-control law expires June 30. If Congress doesn't write some flexibility into the next law we can expect stabilized shortages instead of plenty of oil.

THIS WEEK

WHERE LEAST EXPECTED.—After the recent California flood, this unusual sight greeted operators of Lloyd Corp.'s properties in Ventura Avenue field. As the waters went down, only the gin pole marked the spot where this well head had been. Three feet of mud and sand had been deposited over the well head by waters flowing down the canyon over the location. The well, a free-pump installation, was still operating when dug out.

STEEL—PAD allocates 588,000 tons of line pipe for oil and gas lines for second quarter. . . . This is a cut of 53,500 tons over the current quarter. . . . ¶Five major gas lines scheduled to be completed this year get 174,520 tons of total. . . .

PIPE LINES—Continental, Sinclair planning 8-in., 310-mile products line between Sinclair, Wyo., and Salt Lake City. . . . ¶Newly formed Coastal Products Pipe Line Co. plans to build 260-mile, 20-in. products line between Houston and Baton Rouge. . . . System would operate as a common carrier. . . . ¶First major pipeline system for distributing ethylene now under construction in Port Arthur area by Gulf Oil Corp. . . .

INTERNATIONAL—Four new Australian refineries will raise country's capacity to 134,000 bbl. daily within 4 years. . . . ¶Creole to build second 26-in. crude line from Ule to Amuay Bay. . . . ¶No major companies show much interest in Bolivia's oil possibilities to date. . . .

SUPPLY AND DEMAND—Dozen major companies, two independents agree to make 3,000,000 bbl. of heating oils available if necessary over next 2 months to avoid shortage on East Coast. . . . This could represent an "out-of-pocket" cost to them of between $7,000,000 and $8,000,000. . . . ¶East Coast supplies of residual oil exceedingly tight, but there is estimated 25,000 bbl. a day surplus in District 2. . . .

NATURAL GAS—Texas Railroad Commission orders shutdown of Fort Chadbourne field because of waste of casing-head gas due to flaring. . . . Field will not be allowed to operate again until gas can be utilized. . . . ¶Under plan proposed by Pacific Northwest Pipeline Corp., eastern Canada would get United States Southwest's gas, in return for Alberta gas into Washington, Oregon. . . .

PRODUCTION—Fastest growing area in Texas Panhandle is Wheat extension to Panhandle field. . . . About 9,000 proven acres have been joined to main field. . . . ¶Pure testing world's deepest potential producer in West Poison Spider field, Wyoming. . . . ¶Deepest production yet found in Permian basin recovered by Buffalo Oil in old shallow Maljamar field, New Mexico. . . .

TIDELANDS—Proposed legislation would permit renewal of offshore oil search and development. . . . Ownership question not touched in interior committee's plan. . . . ¶Stalemate between state, federal governments over tidelands oil-production management is costing oil industry millions of dollars annually to maintain idle offshore properties, equipment. . . .

INDUSTRY—Strikes in large segment of petroleum industry threatened by president of Oil Workers International Union. . . . ¶Lion Oil Co. plans to spend $5,000,000 in expanding its El Dorado, Ark., refinery, boosting its capacity to 23,500 bbl. daily. . . . ¶Southwestern drilling wages going up as result of WSB decision. . . . ¶Small sulfur plants producing at less than 20 tons daily are economically feasible at current prices, W.P.R.A. told. . . .

ACTIVITY—Crude production averaged 6,235,625 bbl. daily for week ended February 2, up 30,775 bbl. daily. . . . ¶Total completions increased 39 wells to 923. . . . ¶Wildcat completions for the week increased to 209 compared with 189 for previous week and 138 for same week last year. . . . ¶Following seven successive weekly decreases, rotary rigs operating in United States increased 36 rigs to 2,740 on February 4. . . .

TRENDS—East Coast distillate stocks on January 12 amounted to 24,458,000 bbl. or 31.8 per cent greater than last year. . . . By January 26 stocks had dropped to 20,323,000 bbl. or only 12.8 per cent more than a year earlier. . . .

Heating-Oil Plan

Major companies agree to provide up to 3,000,000 bbl. extra of heating oils at own expense to offset shortage

WASHINGTON.—Twelve major and two independent oil companies have agreed to make 3,000,000 bbl. of heating oils available if and as necessary over the next 2 months to avoid a shortage on the East Coast, at an estimated out-of-pocket cost to themselves of between $7,000,000 and $8,000,000.

The companies agreed to this after an earlier proposal by the Office of Price Stabilization for a subsidy was rejected.

These companies will participate in a voluntary agreement shortly to be submitted to the Department of Justice and Federal Trade Commission. They will deliver the oil at present ceiling prices to East Coast resellers designated by the Petroleum Administration for Defense.

Denied a price increase sought by PAD or the transportation subsidy suggested by the Office of Price Stabilization, the industry moved to prevent a shortage on the East Coast on nothing more substantial than a promise by Mobilization Director Charles E. Wilson and Stabilization Director Roger Putnam that the OPS "will carefully review the price ceilings of petroleum products on the East and Gulf Coasts and will institute any agreed-upon changes no later than June 1, 1952."

Plan killed.—The plan for a government subsidy was killed by Wilson and Production Administrator Manly Fleischmann, after it had been suggested to the companies by Deputy Petroleum Administrator Bruce K. Brown in calling them to meet with him last week, on the ground of fears that demands for subsidies would spread to other industries.

As a result, Assistant Deputy Administrator A. P. Frame, presiding at the meeting due to Brown's absence because of illness, had to put it flatly up to the companies to see that no householder on the East Coast goes cold this winter.

Frame explained that warm weather during January had reduced the possibility of shortage from the 6,000,000 bbl. originally foreseen to not more than 3,000,000 bbl. but this shortage, if it occurs, would be greater than that of 1947-48 which received nationwide attention and was the subject of several congressional investigations.

Companies involved.—Companies agreeing to provide any additional heating oil needed up to a maximum of 3,000,000 bbl., of which 15 per cent may be in the form of kerosine, included Gulf Oil Corp., Esso Standard Oil Co., The Texas Co., Socony-Vacuum Oil Co., Inc., Shell Oil Co., Sinclair Refining Co., Sun Oil Co., Atlantic Refining Co., The California Co., Cities Service Oil Co., American Oil Co., Tide Water Associated Oil Co., Hess, Inc., Perth Amboy, N. J.; and J. M. Paterson, Inc., Philadelphia. The latter two are suppliers with no refining facilities of their own.

A subcommittee consisting of George Koegler, Standard Oil Co. (N.J.); John Scott, Socony-Vacuum, and Ray Connor, Gulf, together with Henry Harkman, Esso Standard, who will work with them, was named to participate in the final drafting of the agreement with PAD, the Department of Justice, and the Federal Trade Commission.

PAD plan.—Before the companies agreed to make 3,000,000 bbl. of heating oils available if necessary over the next 2 months to avoid a possible shortage, OPS had proposed and PAD had developed a voluntary agreement to insure adequate supplies through the remainder of the heating season. Under that plan, the Government would make up losses of the 12 major suppliers serving the East Coast on all heating oil brought in in excess of their commitments.

With present Gulf Coast prices and the greatly increased spot tanker rates, supplying companies cannot move extra supplies to the East Coast and sell them at ceiling prices without taking a loss.

The idea of a voluntary agreement was worked out after the Office of Price Stabilization turned down a PAD recommendation for an increase in ceiling prices along the East Coast averaging ½ cent per gallon. OPS said the estimated $14,000,000 to $15,000,000 cost of such an increase would be inflationary and suggested that a transportation subsidy, estimated to cost $6,000,000, would be a cheaper way of handling the problem.

The need for action arose out of the trebling of tanker rates from the Gulf Coast to the East Coast during the last half of 1951. Approximately 70 per cent of seaboard requirements of heating oils is supplied from the Gulf, the remainder from refinery operations on the East Coast.

Laid before industry.—The voluntary plan was laid before the industry last week at a meeting called by Deputy Petroleum Administrator Bruce K. Brown to which the 12 major suppliers and 32 East Coast resellers were invited.

The suppliers were asked to agree to deliver, by tanker, barge, or tank truck at East Coast points as directed by PAD, additional quantities of distillates up to approximately 10 per cent of their total commitments for February and March, of which 15 per cent would be in the form of kerosine.

Suppliers agreeing to furnish additional oil could take advantage of a reimbursement plan, filing claims with the Government for reimbursement for their additional costs.

These costs would be based on a price of 8 cents per gallon for No. 2 fuel at the Gulf Coast or the actual Gulf Coast purchase price, whichever is higher, and tanker transportation costs at 100 per cent over Maritime rates or actual charter rates.

Costs for barge or tanker-truck deliveries from East Coast locations would be based on the Gulf Coast price of 8 cents per gallon, plus tanker freight at 100 per cent over the Maritime rate and 7½ cents per barrel terminalling charge.

Supply Situation Spotty

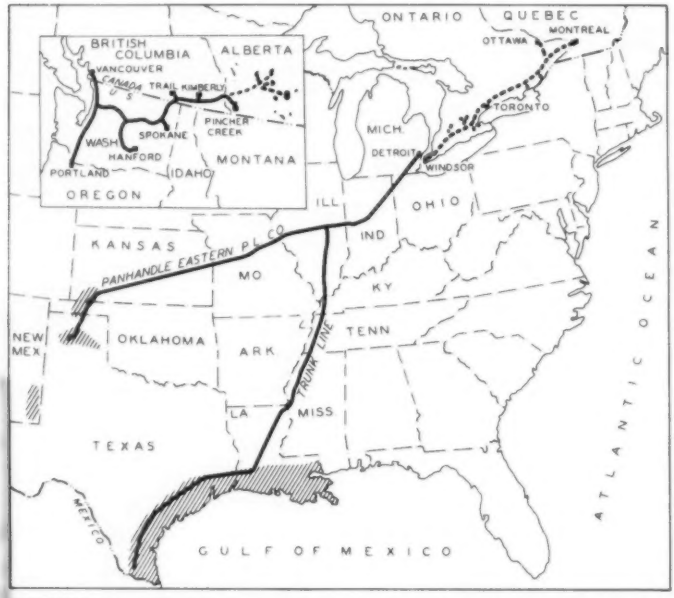
WASHINGTON.—East Coast supplies of residual oil are exceedingly tight while there is an estimated 25,000 or more barrels a day surplus in District II. Between them lie Office of Price Stabilization ceilings which make it economically impossible to bring the two together.

A world shortage of 100,000 bbl. daily—"some put it as high as 175,000"—is foreseen over the next 6 months by Deputy Petroleum Administrator Bruce K. Brown, who emphasized that this is a shortage of product in distinction to the East Coast shortage of heating oils, basically due to price.

Brown explained that the cost of transportation of residual from District II to the East Coast is an effective deterrent to its movement, and expressed the belief that the oil now surplus in the mid-West will find a market there in competition with coal.

He made this statement in commenting upon suggestions that have been thrown out that oil surplus in the interior could be made available to the East Coast by "red ball" freight trains such as were operated during the war when the tanker movement was cut off.

Brown said it is impossible to augment East Coast supplies by converting utilities from oil to coal, explaining that most of the plants that could convert already have done so for economic reasons.



EXPORT-IMPORT PLAN.—Map shows existing and proposed systems through which Pacific Northwest Pipe Line Corp. would supply eastern Canada with gas from the U. S. Southwest in return for an equal quantity from Alberta fields for markets in the Pacific Northwest.

Gas "Swap" Proposed

Eastern Canada would get Southwest gas, Alberta would ship to Washington under new plan of Pacific Northwest

Robert J. Enright

A PRECEDENT-SETTING international exchange of natural gas between the United States and Canada may result if a proposal now being pushed by Pacific Northwest Pipeline Corp., Houston, pans out.

Essentially, the plan involves importing about 250,000,000 cu. ft. of gas daily from fields in Alberta to supply the U. S. Pacific Northwest and southern British Columbia in return for an equal quantity of gas piped to eastern Canadian markets from fields in the U. S. Southwest.

With materials as short as they are, Pacific Northwest says, an exchange of gas is the only feasible way to serve the two markets. Otherwise, new lines must be built from the U. S. Southwest fields to Washington, and from Alberta fields to eastern Canada.

The company says building these lines would cost about $318,000,000 and take 950,000 tons of steel more than serving the areas under the new proposal.

To eastern Canada.—Under the reciprocal-exchange plan, gas for eastern Canada would be supplied from the U. S. Southwest and shipped by Panhandle Eastern Pipe Line Co., together with its subsidiary, Trunkline Gas Co., under an arrangement with Pacific Northwest.

C. R. Williams, president of Pacific Northwest, said Panhandle had agreed, under certain conditions, to boost by 125,000,000 cu. ft. daily the capacity of its so-called "third loop" on its main line to Detroit from the panhandle fields of Kansas, Oklahoma, and Texas.

The remaining 125,000,000 cu. ft. would come from Texas Gulf Coast fields through Trunkline's system, which connects in Illinois with Panhandle. In both cases, capacity could be increased with relatively small use of steel and compressors, he said.

Panhandle already has 60 per cent of the additional gas reserves it would need, Williams added, and can get the remainder relatively quickly.

Gas would be delivered through Panhandle's system to Prairie Pipe Lines, Ltd., a subsidiary of Pacific Northwest, at Windsor, Ont., directly across the river from Detroit. A new transmission system would carry the gas from Windsor, through Chatham, St. Thomas, Hamilton, and Toronto, Ont., to Montreal, Que. One of several laterals would serve Ottawa, Ont. Panhandle already has two 12-in. lines crossing the river boundary through which a limited quantity of off-peak gas is piped out of the country to Union Gas Co. of Ontario.

To Pacific Northwest.—In return for the gas supplied eastern Canada, Pacific Northwest would import the same amount of gas through a new system connecting Pincher Creek, Countess, Cessford, Princess, Medicine Hat, and other Alberta fields with markets in the Pacific Northwest and southern British Columbia.

Economics.—The reciprocal-exchange plan is estimated by Pacific Northwest to cost about $140,000,000 and to require about 254,000 tons of steel. Of this total, the line from Pincher Creek would cost an estimated $86,000,000 and take 150,000 tons of steel, while required investment for the system from Detroit to Montreal would be about $54,000,000 and 104,000 tons of steel.

With a load factor of 85 per cent, sale price of the gas in the Pacific Northwest market area would be about 32 to 33 cents per thousand cubic feet. With the same load factor, gas would be marketed in eastern Canada at 42 to 44 cents per thousand, company figures show.

The entire system would serve initially an estimated 4,500,000 consumers in eastern Canada, 500,000 in British Columbia, and 3,000,000 in the U. S. Pacific Northwest. These consumers, the company said, would be in addition to vital defense industries served by both systems.

By direct service, the nearest logical source of supply in the United States for the Pacific Northwest would be Texas fields, the company says, while the only feasible national source for eastern Canada would be the fields in Alberta. Construction of these lines would cost $448,000,000 and take 1,203,227 tons of steel.

Gas piped through a new line from Texas to the Northwest would cost the consumer about 38 cents per thousand cubic feet, and construction of a line from Alberta fields to eastern Canada markets would necessitate cost to the consumer of about 50 cents per thousand.

Company figures show that gas delivered under the reciprocal-exchange proposal thus would cost the consumer 6 to 8 cents less per thousand in both areas, and would result in savings to consumers at initial projected throughput of more than $100,000,000 in 20 years.

Status.—The entire project has been laid before the Petroleum and Natural Gas Conservation Board of Alberta with testimony by both Pacific Northwest and Panhandle, according to Williams of Pacific.

The companies also have discussed the project with the Minister of Mines of Ontario, representatives of four Ontario gas companies, and officials of the Canadian Government.

For the proposal to materialize, permissive legislation must first come from Alberta's conservation board, the U. S. Federal Power Commission, and Canada's Board of Transport Commissioners. In addition, authorization for procurement of pipe, compressor units, and other material must be obtained from governmental authorities.

Pacific figures that one of its first hurdles will be to convince the Alberta board that the province has an exportable surplus of gas.

In January 1951, the board ruled that then proved reserves in the province were about in balance with requirements for the next 30 years and no gas was then available for export. However, in the past year development of reserves has been greatly accelerated, Pacific said, and it is anticipated that the board will announce an exportable surplus of some volume soon. Proven reserves in the province are now in excess of 8 trillion cubic feet, the company said.

Change in plans. — The reciprocal-exchange proposal is an abrupt departure from Pacific Northwest's original plan to build a 2,100-mile line from Texas to Washington with a capacity of 250,000,000 cu. ft. per day and to import about 100,000,000 cu. ft. per day into the same market area from Alberta. *(The Oil and Gas Journal, December 21, 1950, page 146.)*

Williams confirmed last week that plans for the Texas-to-Washington line had been dropped. Scarcity of materials and prohibitive cost as well as economic advantages of the new plan were advanced in some quarters as being factors in the decision.

The company said the project now planned can be initiated as soon as necessary government authorizations come through. Gas deliveries would be scheduled for 24 months after the start of construction. Testimony before the Alberta board revealed that financing for the project has been arranged with Whiteweld & Co., New York; Kidder-Peabody & Co., New York; and Dominion Securities Corp., Montreal and Toronto.

Humble offer. — No announcement has been made by the company yet as to how a recent offer by Humble Oil & Refining Co. might affect the plan as it stands now. Humble offered to sell Pacific Northwest a maximum of 150,000,000 cu. ft. daily of its southwestern reserves as part of the supply for eastern Canada.

In addition to Prairie Pipe Lines, five companies have applications before the Alberta board for permission to export gas. They are Northwest Natural Gas Co., Trans-Canada Pipe Lines, Ltd., Westcoast Transmission Co., Ltd., Western Pipe Lines, Ltd., and McColl-Frontenac Oil Co., Ltd.

U. S. Tankship Fleet Grows

The privately owned tanker fleet of the United States will be raised to an all-time peak carrying capacity with the completion of a number of new vessels being constructed in United States shipyards this year, according to the annual report of the American Bureau of Shipping.

The private tankship fleet in the United States now numbers 437 units totaling 4,261,612 gross tons and 6,776,862 dwt., the report said.

A tremendous volume of business aggregating more than 13,000,000 gross tons is now booked with the shipbuilding yards of the principal maritime nations of the world. The total would be even greater if more steel were available, particularly in the United States where shipyards are unable to consummate offered contracts, the report said.

Several recent developments point to the advances being made in ship construction. Huge oil tankers of 40,000 dwt. became a reality last year with the ordering of two from a German shipyard, while four of 38,000 tons each will be built in Japan for United States interests. Gas turbines are being proven up for merchant ship propulsion, and an oil tanker was so equipped in 1951, the report commented.

Wide Strikes Threatened

DENVER.—Strikes in a large segment of the petroleum industry were threatened last week by O. A. Knight, president of the Oil Workers International Union (C.I.O.).

Knight said about 300 bargaining units of the union have been asked to take strike votes. Voting is expected to be completed by February 15. Altogether the union claims more than 600 bargaining units dealing with about 350 oil companies.

Strike of a local unit requires approval by three-fourths of the members in a secret-ballot election. Knight said his call for the strike votes followed instructions of the union's policy committee, which met a week earlier in Kansas City.

The union is seeking a general 25-cent hourly wage increase.

Industry Briefs

TULSA. — Purchase of Mazda Oil Corp., Tulsa, by National Phoenix Industries, Inc., New York, has been completed and new Mazda directors elected. Walter S. Mack, Jr., National Phoenix president, said Mazda properties will be operated by San Juanito Oil Co., Dallas. New Mazda directors are Thomas A. Knight, Dallas; Julius Livingston, Tulsa, former Mazda president; Mack; Albert Fink Milton, New York; Lloyd H. Smith, Houston; and Richard Weininger, New York.

MARIETTA, Ohio.—Secondary-recovery committees of the Interstate Oil Compact Commission from Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia will meet here February 15 with the petroleum department of Marietta College to discuss secondary-recovery activities in the states.

PHILADELPHIA.—Sun Oil Co. has ordered two more supertankers of 20,000 dwt. from Sun Shipbuilding & Dry Dock Co., a Sun subsidiary, bringing to four the number now on order. Capacity of the big tankers is about 250,000 bbl. of crude oil. Construction is under way on the first two ordered.

AUSTIN.—The Texas Railroad Commission will conduct a hearing here March 5 on a proposal to combine under one pool name all areas producing from the Spraberry sand. Selection of a name also will be considered at the hearing. Spraberry production is now obtained from 20 separate fields in 11 counties. These fields encompass about 2,000,000 acres.

SANTA FE.—Oil-company employes who buy and sell leases do not come under the New Mexico real-estate licensing law, Attorney General Joe L. Martinez has ruled. Other persons so engaged, he said, will be considered real-estate brokers under the law. The opinion was sought by Richard R. Spurrier, secretary of the state oil-conservation commission, after the question had been raised by several Texas and Oklahoma oil companies.

ST. LOUIS. — A resolution urging that cooperatives be required to pay state and federal taxes at the same rate as all other enterprises with which they compete was adopted by the Missouri Petroleum Association at its meeting here last week.

TULSA. — Sunray Oil Corp. has awarded Lummus Co. the contract for construction of its new 28,000-bbl. refinery 7 miles west of Corpus Christi. Completion is scheduled in late summer of 1953. The refinery will include a Universal Oil Products Co. fluid catalytic cracking unit, a Lummus crude-distillation unit and treating facilities.

Youthful Oil Area

Midland County's map, now well-spattered with oil fields, showed one producer, now abandoned, only 7 years ago

Roy F. Carlson

MIDLAND, Tex.—As recently as 1945 there wasn't a single oil well in Midland County, Texas.

Late in that year Midland field was discovered—a one-well field which since has been abandoned. Two years later another field was found—Midland South, also a one-well reservoir until just a few months ago.

Today the story is much different. At the beginning of February the county claimed 627 producing wells, of which 512 were completed in the Spraberry formation.

Although the county had production before the Spraberry trend drilling became so intense, it was Spraberry oil that brought a concentration of rigs into the area. The county's 512 Spraberry producers on February 1 figured 1 well more than exactly half of the 1,023 wells completed in the entire Spraberry trend.

Ector developed first.—Midland County's western neighbor, Ector County, was a producing area for years while Midland remained a have-not county.

Oil production in Ector began in 1928. Development here came first because the county overlies what is known as the central basin platform, making rather shallow production easily available, while in the Midland basin most of the productive sedimentary rocks lie at much greater depths.

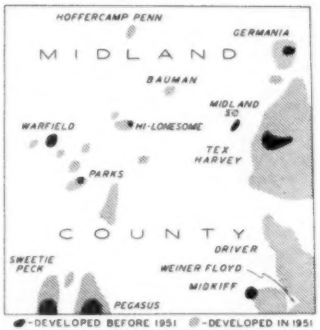
Starting in 1949, however, a large number of fields were found in Midland County in rapid succession: Tex Harvey, which started the Spraberry trend campaign in Midland County; Warfield Ellenburger, a small but deep producer in the center of the deep Midland basin; and Pegasus, Sweetie Peck, Parks, Hi-Lonesome, Bauman, and Hoffercamp, all fields producing from deep formations predominantly from the Ellenburger and Pennsylvanian pays.

Although development in these latter areas has not been as spectacular as in the trend area, it has been steady, and has materially added to the productive capacity of Midland County fields, and it has remedied the oil drouth in Midland County.

18 reservoirs.—Recent figures show that Midland County has 18 separate reservoirs, according to Texas Railroad Commission designations. Some of these are in multipay fields, such as Sweetie Peck.

As shown by accompanying table, these fields produced a total of 1,404,811 bbl. of oil during November 1951. Of this total, 1,208,893 bbl. came from Spraberry wells. These totals do not include production from the Midland County portion of Pegasus field.

At the end of January, 127 field wells were being drilled in Midland County, 108 of them being Spraberry ventures, and the other 19 probing for the deeper pays. A tabulation of these is also included. Seven wildcats were also in progress.



MIDLAND COUNTY NOVEMBER PRODUCTION

Field—	Month total	No. wells	Daily allow. Jan.
Driver	322,725	132	13,275
Tex-Harvey	745,245	355	30,144
Germania	85,392	49	3,763
Midkiff	55,218	27	2,424
Warfield Spby.	313	1	32
Warfield Penn.	246	1	14
Hoffercamp Penn.	1,892	1	202
Parks	60,558	16	2,049
So. Midland	1,279	2	29
Texas Co. 1-B (NCT-2) Schar.	624	1	
Texas 1-C Schar.	399	1	
Bauman	2,277	1	100
Sweetie Peck:			
Devonian	871	1	53
Wolfcamp	6,116	3	29
Penn.	45,502	20	2,228
Fusselman	3,406	1	70
Ellenburger	69,046	12	2,549
Hi-Lonesome	5,633	3	364
Total	1,404,811	627	60,522

MIDLAND COUNTY DRILLING ACTIVITY

Field—	Wells drilling
Tex-Harvey	44
Parks	8
Weiner Floyd	5
Driver	29
Midkiff	18
Germania	12
Pegasus Ellenburger	4
Pegasus Pennsylvanian	2
Sweetie Peck Ellenburger	1
Sweetie Peck Pennsylvanian	3
Bauman	1
Total	127

Total includes 108 Spraberry wells, 19 others. Not included in total are 7 wildcats now drilling.

Panhandle Hot Spot

9,000 proven acres added to Texas area

AMARILLO, Tex.—The fastest growing area in the Texas Panhandle is the Wheat extension to that portion of Panhandle field in southwestern Gray County (arrowed on map).

Approximately 9,000 acres of proven production have been joined to the main field and indications are that more than twice that number will eventually be found productive.

Although the pace of activity has slackened from the summer's peak, with only two rigs currently operating, drilling operations are to commence soon on four locations waiting for rotary tools. Ten wells shut in, waiting for Railroad Commission test, are expected to add 35,000,000 cu. ft. of gas daily to the area's total on completion. Completed wells now number nine (one gas, six oil, and two dry holes).

Discovery well.—Phillips Petroleum Co. 1 Wheatley, discovery well in Section 3, Block C-2, CCSD&RGNG Survey, was completed in November 1950 for an initial flow of 5,250,000 cu. ft. of gas per day from pay at 2,833-71 ft. A month later Phillips 1 Wheat, 2 miles east, had a successful test of 114 bbl. of 38 -gravity oil per day from 2,786-2,825 ft. Both wells were located on the basis of gravity meter and subsurface geological information. Closest production at the time was 3 miles north.

In June 1951, Cabot Carbon Co. spudded 1 Kirby-McConnell in Section 19, Block S, L. L. Erwin Survey, and completed the well for 76 bbl. of

MAP showing Wheat extension area.

oil per day. The Cabot lease now produces the major portion of the oil in the extension area, having a potential of 411 bbl. of oil per day from four wells. Two oil wells owned by Phillips have potential of 264 bbl. per day.

Production in the area is from the Wolfcamp of Permian age, at depths varying from 2,500 to 2,900 ft. Producing formation is a buff, crystalline dolomite. Good results have been obtained both by shooting and by acidization of the dolomite.

Panhandle extension.—The Wheat area is an extension of Panhandle field production along a southeastward plunging nose on the south flank of the buried Amarillo mountains. Oil is found on the eastern flank of this nosing, with gas higher on structure.

Phillips 1 Bralley, Section 7, Block C-2, CCSD&RGNG Survey, completed dry at 3,114 ft. in granite, reveals a southwestern limit of production. Northeastern boundary is marked by Taylor Oil Co. 1 Taylor "K," Section 73, Block B-2, H&GN Survey, which was dry at a total depth of 3,330 ft.

A similar extension to Panhandle field, several miles east of the Wheatley discovery, is indicated by T. J. Wagner, Jr., 1 Goldston. This well, located in Section 3, Block 1, BS&F Survey, was completed in December for an initial flow of 9,300,000 cu. ft. of gas from dolomite pay at 2,317-83 ft. A second Wagner wildcat 4 miles east of the Goldston is drilling into prospective pay with cable tools. No oil has yet been found in this second extension area.

Field Shut In

Plan to utilize gas needed to reopen Fort Chadbourne

AUSTIN.—Fort Chadbourne oil field in Coke and Runnels counties in West Texas was shut in by the Texas Railroad Commission February 1 because of waste of casing-head gas.

The field has 225 producing wells and a daily allowable production of approximately 17,000 bbl. of oil, and commission engineers estimate it has been flaring 11,000,000 cu. ft. of natural gas daily.

The shutdown order is to remain in effect until the operators can secure approval of a plan to utilize the gas or convince the commission that no conservation plan is feasible. The only exception to the order is that sufficient oil may be produced to furnish casing-head gas for heating and cooking in the field.

Earlier the commission had ordered the operators in Fort Chadbourne field to show cause why they should be permitted to continue to flare gas, and a hearing was held in December. At that time it was explained that Warren Oil Corp. had withdrawn an offer to build a natural-gasoline plant in the field, but two other possibilities were discussed.

Humble Oil & Refining Co., the largest operator in the field, advocated returning the gas to the producing formation for pressure maintenance provided problems of unitization could be worked out. This plan was supported by some operators but opposed by others who doubted that repressuring would be feasible or desirable.

Burdell Oil Co. and others advocated asking Lone Star Producing Co. to build a natural-gasoline plant in the field and put the residue gas into its gas pipe line between Sweetwater and Bryan, which runs within 4 miles of the field. Humble is understood to oppose this, presumably because of its policy of keeping its gas out of interstate commerce.

An engineering committee of Fort Chadbourne operators is currently attempting to draw up a conservation plan for approval of the commission.

The commission's shutdown order was made effective despite pleas of the operators that they be allowed more time to agree on a conservation program, a fact which indicates that the commission is not disposed to be lenient in condoning preventable waste.

Lion to Expand Refinery

EL DORADO, Ark.—Lion Oil Co. is planning a $5,000,000 expansion program at its refinery here which will boost its capacity from 22,000 to 23,500 bbl. daily.

T. M. Martin, Lion president, said contracts covering design and construction of new process units are now being prepared.

New units will include a fluid catalytic cracking unit with integral vapor-recovery equipment and a 1,150-bbl. alkylation plant. The cat cracker will have a daily capacity of 5,000 bbl. of fresh charge and 5,000 bbl. of recycle charge.

The company also will add a 16,000-g.p.m. cooling tower, two steam generators, and storage facilities.

Martin said the expansion will permit an increase of about 50 per cent in gasoline yields and a reduction in output of lower-profit burner and fuel oils. Lion has been granted a certificate of necessity providing for rapid amortization on about 75 per cent of the total cost of the new units.

Drilling Wages Increased

DALLAS. — Southwestern drilling wages are going up as a result of a decision of the Wage Stabilization Board.

The national office of WSB has authorized its tenth regional office here to approve all pending applications for wage boosts up to the "Rowan rates" approved September 28 for Rowan Drilling Co.

These rates provide $2.36 an hour for drillers, $1.76 for engineers, firemen, and derrick men, and $1.66 for helpers. These rates represent an increase of 20 cents an hour over the prevailing rates for drillers and 15 cents an hour for other classifications.

The previous rates of $2.16, $1.62, and $1.51 had been in effect since late in 1950. Since that time some contracting companies had increased wages slightly by cost-of-living bonuses and other minor permitted adjustments, but these generally came to only about half of the newly granted increase. Others had kept wages unchanged while waiting for the expected increase in the ceiling.

Granting of the wage increases followed a series of hearings by a WSB panel held last November.

Deep Maljamar Pay Found

ARTESIA, N. M.—Deepest production in the Permian basin has been found by Buffalo Oil Co. in the old, shallow Maljamar field in Lea County, New Mexico, about 35 miles east of here.

The company's 12 B. M. E. Baish gaged 610 bbl. of 47°-gravity oil through open 2-in. tubing on a 24-hour test without acid treatment. Production was from the Devonian between 13,557 and 13,568 ft., total depth. Operators killed the well and planned to core deeper before completing.

The new well is in an area which produces from Permian limestone at about 4,000 ft. Nearest Devonian production is in Saunders field, 20 miles northeast. The well topped the Devonian at 12,560 ft.

ROCKY MOUNTAIN

Deepest Producer Indicated

CASPER, Wyo.—The world's deepest potential producer is now being tested by Pure Oil Co. in West Poison Spider field in Natrona County, Wyoming.

Oil has been recovered from the Morrison-Sundance formation between 16,071-16,607 ft. at Pure's 3 Unit, SW NW SE 10-33n-84w. Following swabbing, the well flowed 6 bbl. of 48°-gravity green oil hourly with considerable gas. The well died the day following the test after kicking out a slug of mud.

If the well proves productive at its present depth, it will set a world's depth record for production. Present holder of the record is Standard Oil Co. of California, whose 5 Mushrush in Kern County, California, is making oil from the Eocene at 15,530 ft. It was completed in 1949.

If present tests by Pure in the

Morrison-Sundance prove nonproductive, the company will perforate casing, which is cemented at 16,071 ft., for testing in what is believed to be the Lakota. Though a large section of the Lakota was cored and well-saturated sand recovered, no tests were made.

This is the third well for Pure at West Poison Spider, where Frontier production was developed in 1948 at 14,307 ft., a depth-producing record at that time. Mesaverde production was found by the company in the field in 1949, at a depth of 10,000 ft.

New Pipe Line Planned

Construction of an 8-in. products line between Sinclair, Wyo., and Salt Lake City, Utah, is being planned as a joint venture of Continental Oil Co. and Sinclair Oil Corp.

The 310-mile line will cost an estimated $8,000,000.

The line will be built and operated by Pioneer Pipe Line Co., a newly organized firm owned 65 per cent by Continental and 35 per cent by Sinclair Pipe Line Co.

Initial capacity will be 12,000 bbl. daily. Plans call for construction at Salt Lake City of a products terminal and tankage for about 500,000 bbl. Tank-car and tank-truck loading racks will be constructed.

The new line is expected to be tied in with the Salt Lake Pipe Line Co. line extending from Salt Lake City to a point on the Columbia River in Washington.

GULF COAST

Tidelands Bill Out

Proposed law would renew offshore search, development, interior committee says; ownership question not touched

Bertram F. Linz

WASHINGTON. — Development of new production in excess of 250,000 bbl. daily off the Gulf Coast within the next 2 or 3 years will follow enactment of interim tidelands legislation, the Senate interior committee declared in reporting the measure to the floor last week.

Other results of adoption of the revamped O'Mahoney resolution (S.J. Res. 20), the committee said, will be to release from their present legal position of "tenants-at-will" the more than 30 companies which have invested more than a half-billion dollars in exploration, development, and production and permit them to go ahead with further development.

The legislation recognizes leases issued by the states to private operators, authorizes the secretary of the interior to issue new leases by competitive bidding for a period of 5 years, requires prior state approval of leases within the 3-mile limit, and provides that 37½ per cent of the revenues from operations within the 3-mile limit shall go to the states and the remaining revenues shall be held in a special fund pending the enactment of final legislation.

Controversy remains.—The resolution will make no change whatever in existing law with respect to property rights or sovereignty over mineral resources of the submerged lands, the committee said, as it neither gives new authority to the federal Government nor takes away either property or sovereignty from the coastal states.

The committee described it as an administrative measure which will not tilt the scales in favor of either side in the basic controversy but will end the stalemate in development and provide additional sources of oil within this country.

PAD wants oil.—The estimate that additional production of more than 250,000 bbl. daily could be developed in the gulf was made by Deputy Petroleum Administrator Bruce K. Brown in a report to Interior Secretary Oscar L. Chapman last month.

"Even this volume would be a notable partial offset to the crude-oil shortage which is expected to exist in an all-out war," Brown said.

Brown's report was purely factual and contained no recommendations as to the form of legislation that Congress should enact.

"We cannot presently regard the volume of the nation's crude-oil reserves with any complacency," he said. "Oil is probably being found at rates at least equal to its withdrawal—and this is no mean achievement in view of today's high production rates. Proven and developed reserves, however, are not increasing fast enough to provide the nation with a cushion in the event of a major war.

"Under these conditions, no proven or semiproven oil province can be overlooked or allowed to lie undeveloped. Yet, just such an oil province is in the submerged areas off the coasts of California, and Texas, Louisiana, and other Gulf Coast states. The Petroleum Administration for Defense has made several studies of the world-wide supply and demand for oil. These studies indicate a serious shortage of crude petroleum in the event of a major war."

"It seems obvious," Brown concluded, "that all efforts should be bent toward freeing for testing and development the largest known, undeveloped oil province in the Western Hemisphere—that is, the submerged areas off our coasts."

Interior wants money.—Fourteen new fields have been discovered in the gulf since 1947 with an estimated reserve of 280,000,000 bbl. and an equally large reserve will be found within the next 4 or 5 years, Secretary Chapman estimated.

The secretary, however, maintained his opposition to recognition of leases granted in the gulf by Texas and Louisiana prior to December 31, 1948, when the suits were filed against those states, contending the cutoff date should be June 23, 1947, when the Supreme Court acted in the California case.

Justice wants authority.—In a report on the position of the Department of Justice, Deputy Atty. Gen. Peyton Ford declared it still believed permanent legislation should be enacted giving the federal Government the authority it seeks but, in view of the oil needs of the current national emergency, would accept the interim measure, which "appears to be adequate for the protection of the interests of the United States until such time as the Congress is able to consider legislation of a permanent character."

More than $47,000,000 has so far been impounded from offshore operations off the coasts of California and Louisiana, the committee disclosed in its report.

Between December 11, 1950, the date of the Louisiana-Texas decrees, and January 10, last, the Interior Department had received $8,207,000 from royalties, rentals, and bonuses on operations in the gulf. Between October 1, 1950, to the end of 1951, the Government received and impounded $10,528,500 from operations in California, and between October 23, 1947, and September 30, 1950, the state had impounded some $28,-288,500.

Tidelands "Drain"

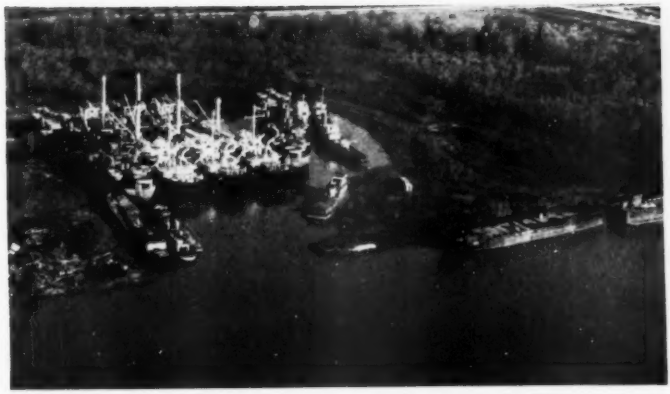
Maintenance costs pile up on idle offshore equipment

Walter Rose

NEW ORLEANS. — The stalemate between federal and state governments over management of tidelands oil production is costing the oil industry millions of dollars annually to maintain its idle offshore properties and equipment.

Off South Louisiana alone, it is estimated that more than $23,000,000 worth of company-owned exploration, drilling, and well-servicing equipment is standing idle.

As one example, The California



WAITING FOR A DECISION.—Rusting away in their peaceful surroundings are idle craft normally used in offshore oil operations. This "port" is typical of many now crammed with oil-industry equipment.

Co. has placed depreciation and cost of maintaining its idle offshore equipment at $750,000 per year. The company produces more than half of the Louisiana tidelands oil—11,010 bbl. daily of an estimated current total production of 17,744 bbl. daily. It could double its production in a year, company officials say, if the political struggle over management of tidelands were settled.

In addition to having to pay heavy maintenance-depreciation costs, operators are running into these other problems:

1. The cost of well servicing and workover is prohibitive since the stopping of drilling activity necessitates use of special equipment and manpower.

These would be more readily available and less costly if exploration and drilling were proceeding normally. Hence, sanded-up wells are going unserviced, as are flow lines where paraffin is a problem. This is partially responsible for a drop in production in the area during the past year.

2. Many of the offshore fields were only partially developed when work was halted. Until activity is again initiated and production increased, the expensive practice of gathering and transporting the oil to shore by standby barges will have to be continued. The companies cannot build pipe lines until proved reserves become large enough to make lines economically feasible.

3. Operators invested much more money than was being returned by early tidelands discoveries, expecting that the ventures would become profitable as soon as engineering developments reduced costs. In many cases this has not happened. The accompanying table lists several of the offshore fields which are producing so little that return on investment cannot be expected.

CURRENT DAILY ALLOWABLES IN LOUISIANA'S TIDELANDS FIELDS

	Barrels per day
Houma district:	
Bay Marchand Block 2 (California Co.)	6,234
Ship Shoal Block 32 (Kerr-McGee)	344
Ship Shoal Block 72 (Magnolia)	718
Lafayette district:	
Eugene Island Block 126 (Magnolia)	1,357
Lake Charles district:	
West Cameron area Block 33 (Phillips)	42
West Cameron area Block 45 (Stanolind)	203
New Orleans district:	
Grand Isle Block 16 (Humble)	56
Grand Isle Block 18 (Humble)	1,440
Main Pass Block 69 (California Co.)	4,776
Main Pass Block 69 (Shell)	944
South Pass Block 24 (Shell)	1,630
Total	17,744

Small Sulfur Units Feasible

BEAUMONT.—Sulfur plants producing at less than 20 tons daily are economically feasible at current prices, refiners at the Western Petroleum Refiners Association technical meeting here were advised.

Minimum capacity of such plants is indicated to be around 5 long tons per day, J. L. Parker of Girdler Corp. pointed out. Cost investigations of these smaller plants, 15 tons and less, were based on a single-stage installation to recover 80 to 85 per cent of available sulfur from the charge stock.

Figures presented by Parker included all operational costs plus investment and related items for plants of 15, 10 and 5-ton capacities. These plants may be operated with a full or part-time attendant. Payout on a 15-ton unit with full-time operator, before taxes and without allowance for depreciation was shown to be 2.67 years. On the same basis but with half-time operator, the same plant has a 2.15-year payout.

Plants of 10-ton capacity range show payouts of 3.54 years with full-time operators and 2.39 years when half-time operators are used. Payout time for a 5-ton unit is 5.35 years when attended by a half-time operator but with a full-time operator this size plant is not economically feasible, Parker said.

Alabama Activity Jumps

BREWTON, Ala.—Humble Oil & Refining Co.'s important discovery near the Florida line has resulted in a rash of leasing activity and plans for a heavy drilling program in the area.

Humble's 1 A. W. Moye found the state's first commercial production of medium-gravity oil 6 miles west of here, testing more than 300 bbl. daily. *(The Oil and Gas Journal, January 28, page 187, and February 4, page 109).*

The company will use the rig which drilled the discovery for another test 1¼ miles to the east. State Geologist Walter B. Jones said Humble has notified his office the company plans to drill 20 wells in the area and that Gulf Refining Co. and Stanolind Oil & Gas Co. also have indicated they will drill in the nearby area.

Petroleum Aids Testing

BATON ROUGE.—The petroleum industry, one of the prime benefactors of improved testing methods, will benefit from continued research in this field, a symposium on modern methods of analytical chemistry at Louisiana State University was told here last week.

In citing, as an example modern methods for giving almost instantaneous analysis, Dr. R. H. Muller, Los Alamos National Laboratary, observed that the old method of measuring the lead content of gasoline took almost half an hour, whereby the X-ray beam can give the information instantly. Further research is being conducted on computing mechanisms which can simplify the research tasks additionally, he said.

The mass spectrometer is an excellent example of what modern industry has obtained from new instruments. Such a device actually "sniffs" the molecules present in gas and draws a curve pattern for each, Muller stated.

The situation now is that many tests can be run in short order by modern methods, but much time is consumed in computing the results. This is why present emphasis is being placed on better computing devices, he said.

The use of colometric tritration has provided a means of continually determining the sulfur content of petroleum gases. Adaptations of this process have already been used in atomic research and show promise of accurately detecting infinitesimal

traces of iron. Dr. W. D. Cooke, of Cornell University, and Dr. Donald Deford, of Northwestern University, stated they have been working on an analytical process so meticulous that it can determine one-billionth of a gram of iron in a fifth-ounce sample. The full potentialities of the method have hardly been explored as yet, but it indicates a possibility that such a method could be used in corrosion studies, they reported.

Products Line Planned

Coastal's 260-mile 20-in. from Houston to Baton Rouge will handle 90,000 bbl. daily on common-carrier basis

George Weber

NEW YORK.—Plans for building a 260-mile, 20-in. products pipe line from Houston to Baton Rouge with an initial capacity of up to 90,000 bbl. per day were revealed here last week by Frederick L. Schuster, president of the newly organized Coastal Products Pipe Line Co.

The new line would cost about $15,000,000. It would be operated as an independent common carrier, to provide Upper Gulf Coast refiners with an economical big-inch outlet to the Southeast and Middle West.

Originating in the vicinity of the Houston Ship Channel, it would serve 19 refineries in the Texas City, Houston, Beaumont, Port Arthur, and Lake Charles areas. These seaboard plants, with an aggregate crude capacity of more than 1,600,000 bbl. per day, represent 23 per cent of the nation's refining capacity.

The proposed line would link the major refining center with the Plantation Pipe Line Co. system which serves the Southeast, and to river-barging facilities extending through the Mississippi River system. A non-shipper-owner, the new company would utilize the "proven principles of 'third-party operation,' previously applied to marketing, whereby oil companies make no investment in pipe-line facilities, thus conserving their capital for other corporate uses," said Schuster.

Oil companies, he added, would be provided adequate future expansion with maximum flexibility, connecting refining and marketing operations at low "sliding-scale" rates decreasing with increasing volumes, at approximately one-half charges for transportation by barges or multiple smaller-diameter pipe lines.

New officers.—Coastal Products also announced the election of two prominent pipe-line figures as new officers. Burt E. Hull, a new director and "special consultant," was, until his retirement last summer, vice president of The Texas Co. and president of Texas Pipe Line Co. During World War II he also served as vice president and general manager of War Emergency Pipe Line Corp. which built and operated the Big Inch and Little Big Inch pipe lines. As the president of Trans-Arabian Pipe Line Co., he recently completed the construction of the world's largest oil pipe line from Saudi Arabia to the Mediterranean before retiring from that position.

A new Coastal Products vice president is Julien B. Adoue, Jr., president and director of Ajax Petroleum Co. of Canada. He served 26 years in pipe-line-executive capacities with Humble Oil & Refining Co., Standard Oil Co. (N. J.), Creole Petroleum Corp., and Imperial Oil, Ltd., and is presently a consultant for Imperial in constructing the Sarnia-Toronto products line. Other officers and directors of the new company include Robert T. Haslam, Paul Ryan, and J. Donald Cook.

Seeking steel.—The new company has filed an application for steel allocations with the Petroleum Administration for Defense. The line might have an estimated initial capacity for moving 80,000 to 90,000 bbl. per day and would supplement the existing Houston-to-Baton Rouge Shell-operated Bayou Pipe Line System which handles petroleum products.

The 305-mile Bayou line has a capacity of about 46,000 bbl. per day.

Coastal's board chairman, Paul Ryan, reports that the volume of all products moving by pipe line, barge, and other means, from the Gulf Coast to the Mississippi River and to Plantation's Baton Rouge terminus now totals about 120,000 bbl. per day. An increase to 130,000 or 140,000 bbl. per day is anticipated this year. Thus, said Ryan, Coastal would permit more economical pipe-line transportation for the product volumes not now handled by Bayou.

U. S. Pipe Line plans.—The same officers and directors serve Coastal Products Pipe Line Co. and United States Pipe Line Co., the latter headed by Haslam. However, these Delaware corporations are separate and distinct.

U. S. Pipe Line, which was organized in 1946 to bid on the Big Inch lines, announced plans for a long distance products line about 18 months ago *(The Oil and Gas Journal, September 28, 1950, page 55)*. Original plans called for a line linking the Gulf Coast with the Chicago area but were later revised in favor of a route through Memphis to terminate at Cincinnati. Steel for this proposed 1,006-mile, $50,000,000 project has been on application before PAD for several months.

May increase line size.—Having made a preliminary survey of probable traffic, the company is now studying the possibility of increasing the line size from 16 to 20 in. Refiners contacted to date indicate they would ship some 60,000 bbl. per day through the common-carrier line. The addition of spot shipments and probable further contract shipments indicate that the line might be built with an initial capacity of 100,000 bbl. per day.

The decision as to which of the two pipe lines will be started first will be made in Washington. It is likely that the Coastal project may get the first nod, since it would require less steel and could be completed more quickly. Officers state that they expect their first pipe allocations to begin in the third or fourth quarters of this year. The two companies are headquartered at 100 Park Avenue, New York City.

First Ethylene System

Gulf building major distribution network to pipe former waste refinery gas to petrochemical firms on Gulf Coast

F. Lawrence Resen

PORT ARTHUR.—A major pipe-line system for distributing ethylene—the first of its kind—is now under construction in this area.

The system is being built by Gulf Oil Corp. to serve several petrochemical plants processing the gas to produce one or more of the many commercial chemicals based on ethylene. These include ethyl alcohol, ethyl chloride, styrene plastic, ethyl fluid, and acrylonitrile, used in fibers.

Source of the ethylene will be a new plant now being built at Port Arthur by Gulf.

To date, Gulf has firm contracts to deliver to Monsanto Chemical Co. at Texas City, Ethyl Corp. at Houston, Koppers Co. at Port Arthur, and E. I. du Pont de Nemours & Co., Inc., at Orange. In addition, Solvay Process Division of Allied Chemical & Dye Corp. has said it will obtain ethylene from the line for a new petrochemicals plant to be built at Orange.

As now designed, the system has

three major sections: a 32-mile line to Orange, a 76-mile segment to Houston, and a 40-mile line from Houston to Texas City.

Expansion indicated. — As construction continues the number of plants to be served by the network of lines shows indications of growing considerably. While Gulf officials decline to comment on possible users until contract negotiations have been completed, any number of plants in the Port Arthur-Texas City-Houston triangle qualify as potential consumers and are located conveniently to the new system.

For example, Shell Chemical Corp. and Rohm & Haas Co. at Houston, Carbide & Carbon Chemical Division and Pan American Refining Co. at Texas City, and Dow Chemical Co. at Freeport all are using ethylene at the present time.

Ethylene is obtained chiefly from refinery gases. Before the advent of the petrochemical industry it was largely considered to be waste. It now is one of the "building blocks" of the petrochemical industry and actually contributes to nearly twice as many important chemicals and chemical classes as its prototypes, propylene and butylene. When combined with other chemicals, it has a wide variety of applications ranging from detergents and solvents to synthetic rubber and insecticides.

Ethylene presents no special problems in pipe-line movement, being a light gas capable of withstanding high pressures. Its handling is similar to that of natural gas.

Other lines.—While other lines have been carrying ethylene, Gulf's program represents the first major distribution system designed for the gas.

Other lines include a 35-mile ethylene line running from Humble Oil & Refining Co.'s Baytown refinery to Carbide & Carbon at Texas City, and a 42-mile line carrying a mixture of liquefied petroleum gas and ethylene from Carbide and Monsanto in Texas City to Dow Chemical Co. at Freeport.

NATIONAL AFFAIRS

Line Pipe Allocated

588,000 tons for oil and gas pipe lines for second quarter is 53,500 tons less than for current period

WASHINGTON.—A total of 588,000 tons of line pipe has been allocated by the Petroleum Administration for Defense for second-quarter construction of oil and gas pipe lines.

The second-quarter allotment is 53,500 tons less than was made available for the same purpose for the current quarter.

In parceling out the available line pipe PAD allocated 218,864 tons to 16 large crude-oil lines, 29,620 to 5 large products lines, and 174,520 tons to major natural-gas lines. In addition, 32,097 tons of pipe was set aside for miscellaneous small crude and product projects, including terminals, small construction, and maintenance, repair and operations. A total of 132,908 tons was provided for several hundred gas projects, including gathering and distribution lines.

Major gas projects.—The five major gas lines, all to be completed in the second or third quarters of this year at a total cost of $307,776,500, will have an aggregate capacity of 1,917,000 M.c.f. daily, as follows:

... **Tennessee Gas Transmission Co.,** extension of the existing Gulf Coast-to-Buffalo line to the New York-Massachusetts border, together with loops; estimated cost, $64,540,000; capacity, 250,000 M.c.f. daily; given 63,720 tons of line pipe for the second quarter.

... **United Gas Pipeline Co.,** Gulf Coast-Kosciusko, Miss.-Monroe, La., line; estimated cost, $116,000,000; capacity, 920,000 M.c.f. daily; given 61,000 tons of pipe.

... **Texas Eastern Transmission Co.,** 826-mile line from Kosciusko, Miss., to Connellsville, Pa.; estimated cost, $74,815,000; capacity, 382,000 M.c.f. daily; given 13,300 tons of pipe.

... **Texas Gas Transmission Corp.,** extension and looping of Texas-Ohio system; estimated cost, $46,126,000; capacity, 260,000 M.c.f. daily; given 25,000 tons of pipe.

... **Lone Star Gas Co.,** 100-mile line from storage fields to the Dallas-Fort Worth area; estimated cost, $5,795,500; capacity, 105,000 M.c.f. daily; given 11,500 tons of pipe.

Crude lines.—Details of the crude-oil and products pipe lines which will be allotted pipe are as follows:

... **Platte Pipe Line Co.,** 1,080 miles 16-20-in., Wyoming to Wood River, Ill.; initial capacity, 70,000 bbl.; estimated cost, $59,000,000; completion date, third quarter; total requirements, 140,880 tons; allotment for second quarter, 33,260 tons.

... **Sinclair Pipe Line Co.,** 683 miles 24-22-in., Drumright, Okla., to Salisbury, Mo., and Chicago; initial capacity, 280,000 bbl.; cost, $51,942,000; completion date, third quarter; total requirement, 144,055 tons; allotment, 62,083 tons.

... **Cities Service Pipe Line Co.,** 64 miles 18-in., Sour Lake, Tex., to Lake Charles, La.; initial capacity, 150,000 bbl.; cost, $3,100,000; completion, third quarter; total requirement, 8,625 tons; allotment, 3,100 tons.

... **Shell Pipe Line Corp. (Rancho),** 463 miles 24-in., McCamey, Tex., to Houston; initial capacity, 209,000 bbl.; cost, $41,593,000; completion, third quarter; total requirement, 124,989 tons; allotment, 24,767 tons.

... **Texas Pipe Line Co.,** 319 miles 22-12-10-in., Louisiana Gulf Coast to Port Arthur, Tex.; initial capacity, 145,000 bbl.; cost, $18,717,430; completion, second quarter; total requirement, 54,246 tons; allotment, 3,678 tons.

... **West Texas Gulf Pipe Line Co.,** 577 miles 26-20-in., West Texas to Gulf Coast; initial capacity, 301,000 bbl.; cost, $39,057,230; completion, third quarter; total requirement, 129,458 tons; allotment, 51,329 tons.

... **Continental Pipe Line Co.,** 134 miles 12-in. Wichita Falls, Tex., to Oklahoma City, and 16 miles 12-in. loop between Oklahoma City and Ponca City, Okla.; initial capacity, 40,000 bbl.; cost, $5,839,000; completion, second quarter; total requirement, 13,141 tons; allotment, 13,141 tons.

... **Continental Pipe Line Co.,** 105 miles 8-in., Rincon Station to Port Isabelle, Tex.; initial capacity, 17,000 bbl.; cost, $1,935,000; completion, second quarter; total requirement, 5,927 tons; allotment, 2,268 tons.

... **Interstate Oil Pipe Line Co.,** 68 miles foreign-made 16-in. and 34 miles 4-6-12-in., Louisiana Gulf Coast to Esso refinery at Baton Rouge; capacity, 22,000 bbl.; cost, $3,590,000; completion, fourth quarter; total requirement, 2,435 tons; allotment, 2,412 tons.

... **Sun Pipe Line Co.,** 99 miles 4-6-8-in., in Scurry County, Texas, as crude feeder to West Texas Gulf; capacity, 35,000 bbl.; cost, $1,000,000; completion, second quarter; total requirement, 5,540 tons; allotment, 5,540 tons.

... **Service Pipe Line Co.,** 30 miles 6-in. gathering system in Knox and Haskell counties, Texas.; capacity, 3,000 bbl.; cost, $487,000; completion, second quarter; total requirement, 1,521 tons; allotment, 759 tons.

... **Service Pipe Line Co.,** 30 miles 10-in., Lea County, New Mexico; capacity, 25,000 bbl.; cost, $569,500; completion, second quarter; total requirement, 2,110 tons; allotment 2,110 tons.

... **Texas Pipe Line Co.,** 187 miles 16-in., Corsicana to Houston tiein with 20-in. to Port Arthur, Tex.; initial capacity, 60,000 bbl.; cost, $7,878,600; completion, second quarter; total requirement, 27,492 tons; allotment, 7,492 tons.

... **Humble Pipe Line Co.,** new outlet for Spraberry field in Upton and Reagan counties, Texas, 4-6-8-12-in.; initial capacity, 30,000 bbl.; cost, $2,173,000; completion, second quarter;

total requirement, 7,575 tons; allotment, 2,509 tons.

. . . **Service Pipe Line Co.,** 29 miles 4-6-8-in. crude-gathering lines in Natrona County, Wyoming; initial capacity, 6,000 bbl.; cost, $588,206; completion, second quarter; total requirement, 1,720 tons; allotment, 1,333 tons.

. . . **Gulf Refining Co.,** 80 miles 24-in., Midland to Colorado City, Tex.; initial capacity, 260,000 bbl.; cost, $5,582,245; completion, third quarter; total requirement, 17,304 tons; allotment, 3,083 tons.

Products Lines:

. . . **Shell Oil Co.,** 565 miles 8-14-in., Wood River, Ill., to Chicago and Detroit; initial capacity, 85,000 bbl.; cost, $15,850,000; completion, third quarter; total requirement, 38,588 tons; allotment, 13,165 tons.

. . . **Bell Oil & Gas Co.,** 145 miles 6-8-in., Ardmore to Drumright, Okla.; initial capacity, 9,000 bbl.; cost, $3,271,396; completion, second quarter; total requirement, 9,012 tons; allotment, 956 tons.

. . . **Ohio Oil Co.,** 255 miles 8-10-in., East St. Louis, Ill., to Indianapolis; initial capacity, 18,000 bbl.; cost, $1,710,000; completion, second quarter; total requirement, 4,530 tons; allotment, 3,399 tons.

. . . **Standard Oil Co. (Ind.),** 316 miles 12-in., Sugar Creek refinery to Dubuque, Iowa; initial capacity, 40,000 bbl.; cost, $10,430,000; completion, four quarter; total requirement, 33,180 tons; allotment, 6,000 tons.

. . . **Susquehanna Pipe Line Co.,** 123 miles 6-8-in., Fostoria to Randolph, Ohio; initial capacity, 17,000 bbl.; cost, $3,095,000; completion, third quarter; total requirement, 9,606 tons; allotment, 6,100 tons.

Renegotiation Forms Mailed

WASHINGTON. — The Renegotiation Board is now mailing to contractors and subcontractors report forms to be used in furnishing information concerning sales of oil products and other commodities to the military services and civilian defense agencies whose contracts come under the 1950 Renegotiation Act.

All contractors dealing with the military and defense agencies are subject to the act, whether their contracts were secured by bid or negotiation.

Two forms are being distributed: Contractors whose income was $250,000 or less, or $25,000 or less in the case of brokers, agents, manufacturers' representatives and sales engineers, will be concerned only with five questions on the back of Form 1, and will not be required to state the amount of receipts or costs or to submit other detailed financial information. Contractors and subcontractors whose income went over the above limits will fill out Form 1 in its entirety and also will file more detailed information on Form 1B.

Form 1 must be filed by March 1

WATCHING WASHINGTON

Bertram F. Linz

Need a Crystal Ball?

Don't make any long-range projections of business based on the Government's 1950 plan to have defense production reach a peak in mid-1953 and taper off thereafter.

Peak production will not be reached before the end of next year, maybe later, and when it does begin to taper off it will be at a much slower pace than originally anticipated.

Administration timetables already have been revised to stretch the mobilization period by 6 months, and may be further revised as time goes on, and defense officials are much less definite than a year ago in fixing the dates on which milestones in the defense period will be passed.

One reason for the setback was the botched-up machine-tool program. Although the machine-tool industry, on the basis of World War II experience, knew and told the Government what was needed to get defense production rolling in high gear, it had to wait months for the large steel allocations it should have been given immediately. Another reason was the uncertainty of the military as to just what they needed—they knew what they wanted, all right, but were slow in bridging the gap between desire and necessity.

Even after the peak of production is reached, defense spending will not taper off very fast. Reasons: New atomic-energy programs, and the high cost of maintaining the fighting forces that are being built up.

All of this means the oil industry will have to plan for ever increasing production to meet the steady growth in military demand and the expanding requirements of the civilian economy.

Let PAD Explain

A lot of people outside the industry, and some inside it, believe the Petroleum Administration for Defense is regulating the day-by-day activities of oil and gas operators.

To clarify the situation it might be well to summarize an explanation given recently by Deputy Administrator Bruce K. Brown as to how PAD develops the "programs" it announces from time to time.

These are not actually PAD programs but, rather, summarizations of what the industry proposes to do in various fields of activity within the limits of the availability of materials.

Oil producers, for instance, were asked last year to report how many wells they planned to drill. These plans totaled up to well over 100,000 wells, an impossibility from the materials standpoint, and the figures were shaved down to the 43,400 wells for which the Defense Production Administration was willing to allot steel.

Similarly, when PAD estimated a 1,000,000-bbl. increase in refinery capacity was necessary it did not direct the industry to undertake that construction. Its difficulty was not in getting the refiners to expand but in securing allocations of materials for the projects that were submitted voluntarily.

It May Spill Over

Current agitation for increased safety in the nation's coal mines, spurred by recent mine disasters, may spill over into the oil and other industries.

Although legislation now under consideration by a congressional committee deals with steps to be taken to insure greater safety of coal miners, Sen. Hubert H. Humphrey of Minnesota plans to make an effort to extend government supervision of worker hazards to all industries.

There will be a bitter fight, of course, over the assumption of this new activity by the federal Government, which it will be charged would be an invasion of the states' police rights, but members of Congress are suffering from an "election complex" which may lead them to vote for things this year which they would not approve if the political campaigns were not imminent.

The Labor Department would like to see legislation of this nature enacted but is afraid Humphrey is going so far that it might be necessary to set up a separate agency to handle the safety work, thereby reducing the importance of the department.

It is estimated that 5,000 employes would be required to administer an all-industry safety law, at a cost of $50,000,000 annually for inspections.

by contractors whose fiscal year ended before November 30, 1951, and by April 1 by those on a calendar-year basis. An additional 60 days is given for filing the more detailed Form 1B.

Exports Hit Low Point

WASHINGTON.—Exports of major petroleum products during the week ended January 11 averaged 169,100 bbl. daily to hit the lowest level since the week ended December 21, according to preliminary figures compiled by the Petroleum Administration for Defense.

The figures, however, are subject to revision as late export declarations reach the Census Bureau. Late reports from Districts 1 and 2 raised the exports for the week ended January 4 from a preliminary figure of 190,000 bbl. to 227,100 bbl. daily.

The January 11 report was featured by an increase of more than 120 per cent in exports of residual fuel oil, bringing them over the 100,000 bbl. daily mark for the first time since PAD began issuance of the figures in December.

Exports by products during the week, compared with the preceding week and the average for 4 weeks, in thousands of barrels daily, were as follows:

	Jan. 11	Jan. 4	4 wks. ended Jan. 11
Aviation gasoline	0	32.4	27.6
Motor gasoline	38.3	39.7	45.5
Kerosine	1.9	9.6	6.1
Distillate	17.0	95.3	46.8
Residual	111.9	50.1	70.1
	169.1	227.1	196.1

Harold Ickes Dead

Old Curmudgeon's marks on industry still remain

WASHINGTON.—Harold L. Ickes, former Secretary of the Interior and for many years prominent in, although not of, the oil industry, died February 3. He was 77 years old.

The self-designated "old curmudgeon," who boasted of the enemies he made, was a Chicago lawyer little known outside his own area when he was named head of the Interior Department by President Franklin D. Roosevelt in 1933, to be the only member of the Cabinet to serve through and beyond the Roosevelt regime.

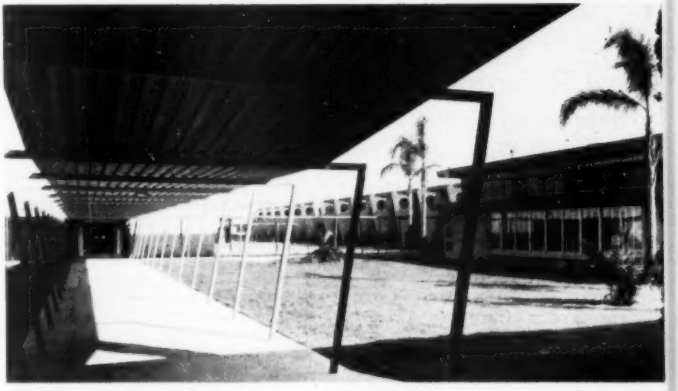
The depression brought Ickes his first job in the field of oil, that of administering the NRA code for the industry. Before the outbreak of the war, Ickes foresaw the need for a unified oil industry effort and organized what became, on its first session the day after Pearl Harbor, the Petroleum Industry War Council. During the war, he was Petroleum Administrator for War and called in Ralph K. Davies, then with Standard Oil Co. of California, to serve as his deputy.

Following Roosevelt's death, Ickes found himself out of harmony with the new Truman administration and looked for a way to resign. He wanted to go out fighting and did so by attacking Truman's nomination of Edwin W. Pauley to be Undersecretary of the Navy. This led to a row with the President, who later withdrew the nomination, and Ickes resigned, his last act being to hold an epoch-making press conference in the auditorium of the Interior Department in which he rehashed the whole story in bitter terms.

It was as war administrator that Ickes developed a plan for government financing of a pipe line across Saudi Arabia in return for an interest in the company. This aroused tremendous industry opposition. He was also prominent in the abortive attempt to develop an Anglo-American oil agreement, which never got through the Senate. If successful, the Anglo-American agreement was to have been the basis for an agreement on oil between all countries.

There was one action by Ickes, however, that outlasted his tenure as a government official—the raising of the question of ownership of the tidelands which resulted in Supreme Court decisions that the submerged lands off the coasts of California, Texas, and Louisiana belong to the Government.

WEST COAST



COVERED WALKS.—Easy access to all 12 buildings is provided by walks like this one.

New Research Lab

Union Oil's $8,000,000 center at Brea centralizes all activities of research, process, and patent divisions

LOS ANGELES.—In 1891, Union Oil Co., with an investment of $2,500, established the first petroleum laboratory west of the Mississippi. Located at Santa Paula, it consisted of one room in back of a "refinery" and had a staff of three, with one microscope.

On February 1-2 the company held open house to officially open its new research center at Brea, 30 miles southeast of here. Consisting of 14 fully equipped buildings on a 100-acre site, the new facilities represent an investment of $8,000,000 and are the most modern in the industry. In contrast to the staff of three at Santa Paula, at Brea there are 312 employes.

Established to centralize the activities of the research, process, and patent divisions of Union's research and process department, activities being carried out at the new center are: Production research, fuels and lubricants research, catalysis and petrochemical research, process development, process engineering, process economics, and patents.

Functional design. — Architecture of the plant is basically single story, with buildings placed so that north lighting is provided in all laboratories. The functional design employed led to use of such construction features as suspended ceilings, cantilevered roof sections, reversed beams,

LATEST IN RESEARCH.—Front view of Union Oil Co.'s recently opened $8,000,000 center at Brea.

and reinforced-concrete walls, ceilings, and foundations.

Laboratories provided at Brea include three buildings for research labs, one for unit processes, an engine lab, and a large two-wing building for analytical laboratories. Remote from this group is the pressure lab where high-pressure and hazardous process reactions can be carried out with reasonable safety. Other buildings at the plant include the administration, library, cafeteria, power, maintenance, and warehouse.

New Pumping Idea

Richfield trying hydraulic system in Wilmington field

LOS ANGELES.—Experiences with a new hydraulic pumping system in which the power oil is kept separate from the produced crude were outlined at a meeting of the American Petroleum Institute West Coast production committee here last night.

Jack Lynch, Richfield Oil Corp. engineer, said the company has about 35 of the closed-system units in Wilmington field. While most have not been in operation sufficiently long to render good performance data, the triple-string units, he said, have indicated they will give results similar to Kobe, Inc.'s parallel-string free pumps.

Altogether, Richfield has some 55 hydraulic pumps in operation on its Pier-A properties, power-oil requirements for which are about 11,000 bbl. daily.

Providing adequate cleaning and setting facilities for this large volume of power oil become a problem because of space limitations on the pier, so about 2 years ago Kobe and Richfield engineers started working on a closed system which would reduce the amount of power oil that had to be prepared daily.

As brought out by Lynch, the Wilmington wells are cased with 8⅝-in. pipe and equipped with 2½-in. tubing. Power oil to the free pumps is circulated through 1 and 1¼-in. macaroni strings, with both the input and output volumes being metered.

Although it was anticipated daily losses of power oil might run as high as 10 per cent, experience to date has shown losses averaging less than 2 per cent, he said.

Record Investment Planned

SAN FRANCISCO.—Standard Oil Co. of California and its subsidiaries will spend approximately $240,000,000 this year on exploration, development, and plant construction and expansion.

The program calls for the largest financial outlay in the company's history, according to R. G. Follis, chairman.

Biggest previous year was 1948, in which the company's capital expenditures totaled $195,000,000. In 1951 they amounted to $183,000,000, Follis said.

About $150,000,000 of the 1952 total will go for oil exploration and production operations in widely separated areas, including Canada, the Williston basin, the Rocky Mountain states, the Gulf Coast and Southwest, California, and Venezuela.

The remaining expenditures, some $90,000,000, has been assigned to various types of plant investments, including the completion of projects begun in 1951. These include a 10,000-bbl. platformer, an 850-bbl. benzene unit, and a 3,200-bbl. toluene unit at El Segundo; and a 50,000-bbl. vacuum unit, isobutane facilities, and a 3,000-bbl. expansion program for alkane facilities at Richmond.

Index Ready Now

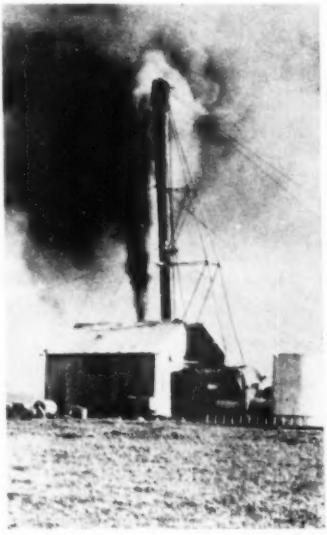
The complete editorial index of The Oil and Gas Journal for 1951 is now ready. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent to you without charge upon request. Address your request to Circulation Department, P. O. Box 1260, Tulsa.

South Cuyama Drilling Idle

LOS ANGELES.—South Cuyama field, in Cuyama Valley about 50 miles southwest of Bakersfield, today is without a drilling well. One location is being prepared by Richfield Oil Corp., but for the first time since the field's discovery in May 1949, drilling is completely halted.

Like nearby Russell Ranch, South Cuyama is almost completely developed insofar as proved oil zones are concerned. A few additional in-fill wells will be drilled, but California's most important oil-field discovery of the past 15 years apparently will see little further development unless deeper pays are found.

Almost 240 oil wells have been completed in South Cuyama since its discovery, of which 197 were drilled by Richfield. The field's current output is approximately 40,000 bbl. daily, nearly all from the main Homan sand.



Oriskany Gasser

The 1 George Arnold, shown here after being shot, gave a good indication of the major proportions of Ohio's recently discovered gas field near Marietta, Ohio (The Oil and Gas Journal, January 21, page 143, and January 28, page 193). The 1 Arnold is 20 miles northeast of the discovery well, Ben Putnam's 1 Wilson. This well, also Putnam's, tested 2,600,000 cu. ft. in 4 hours.

INTERNATIONAL

AUSTRALIA

New Refineries

Four plants will raise Australia's capacity to 134,000 bbl. daily; Asia soon to be virtually self-sufficient

Dahl M. Duff

THE Far East and Southeast Asia, once the major outlet for products from the Abadan refinery in Iran, will become virtually self-sufficient in refining capacity within the next 3 or 4 years.

One of the principal factors will be the projected 60,000-bbl. daily Anglo-Iranian Oil Co., Ltd., refinery on the West Coast of Australia.

From the standpoint of size, the Fremantle refinery of Anglo-Iranian overshadows other refinery construction in this part of the world. This construction includes two new plants in India planned by Standard-Vacuum Oil Co. and the Burmah-Shell organization; a new refinery to be built in the Philippines by the Caltex group; and the continuing expansion of Japan's Pacific Coast refineries.

Anglo-Iranian plans to spend the equivalent of close to $90,000,000 for the completely new refinery at Fremantle. The installation will be completely modern and will include what has been described as substantial catalytic cracking capacity. Between 3,000 and 4,000 men will be involved in its construction during the next 3 to 4 years.

Australia happy.—The company's decision to locate the plant at Fremantle was welcomed by the Australian Government which is eager to promote the industrial development of this part of the continent. At present, the preponderant majority of the country's population lives in the southeast and eastern areas which include such cities as Sydney, Melbourne, and Brisbane.

The Australian Minister for National Development, Senator Spooner, who announced recently that Anglo-Iranian had reached broad agreement with the Commonwealth and West Australian Governments for location of the refinery at Cockburn Sound, a few miles south of Fremantle, said the project would give impetus to other industries in the area. Gas from the refinery, he said, would be available for local industrial consumption or for augmenting output of existing gas works.

The plans call for dredging Cockburn Sound to take 32,000-ton tankers to berths at the waterfront of the refinery site. The director of Commonwealth Oil Refineries, Ltd., said in Melbourne that four coastal tankers of 15,000 tons capacity each would distribute products to eastern Australian ports and possibly to New Zealand and other Pacific destinations.

Anglo-Iranian and the Commonwealth government now share ownership of Commonwealth Oil Refineries, which operates a 2,500-bbl. daily refinery at Laverton near Melbourne. The new Fremantle project, however, will be carried out by Anglo-Iranian alone with its own capital.

Concurrent with the refinery construction will be a major expansion of the distribution facilities of Commonwealth Oil Refineries, which is to market the Fremantle products in Australia. Reports from Australia are that part of the Commonwealth cabinet for a time favored selling the government's share of C.O.R., but since this was considered politically inadvisable, the government is now faced with furnishing half of the estimated A£12,000,000 (about $26,400,000) required to provide the additional storage and other distribution facilities needed by C.O.R.

Current consumption.—Australia's present petroleum consumption amounts to roughly 110,000 bbl. daily against a refining capacity of slightly more than 20,000 bbl. daily. The need for product imports has long caused the government to encourage domestic refinery construction, and the present boom along this line indicates a nearly balanced refinery production and products consumption by 1956. By that time consumption is expected to have risen to some 150,000 bbl. daily.

The principal companies interested in Australian refining and marketing are C.O.R., Shell, Caltex, and Standard-Vacuum. The government for 10 years sought to build up a shale-oil industry at Glen Daves in New South Wales but finally decided about a year ago to close down this project. The plant is still operating, but the government has appointed a receiver to sell its assets at public bid.

The other three companies in Australia aside from Anglo-Iranian all have producing interests in Indonesia, although Anglo-Iranian in partnership with Standard-Vacuum has been carrying on a costly exploration program since the end of the war in Australian New Guinea. Standard-Vacuum, with production in Sumatra and a 64,000-bbl. daily refinery at Sungei Gerong, now has a small 2,000-bbl. daily lubricating-oil and asphalt plant at Altona, near Melbourne. The company announced in August this would be expanded to about 14,000 bbl. daily by the construction of a complete new refinery which would include catalytic cracking. Cost will be about $17,000,000.

Shell refinery.—Shell has a refinery at Clyde, N.S.W., with a capacity of 8,800 bbl. daily. Last May, the company announced it would build a refinery at Geelong, near Melbourne, with a capacity of 1,000,000 tons, or about 20,000 bbl. daily. Shell said the refinery would operate on British Borneo crude, which it said is nearly a 100 per cent sterling source.

Caltex has a minority interest along with Australian capital in the Bitumen & Oil Refineries (Australia), Ltd., which operates an 8,000-bbl. daily refinery at Matraville, near Sydney. Caltex's 40 per cent interest in this company was paid for by supplying of crude oil.

Caltex project.—Caltex's new project is for the construction of a refinery of some 21,000 bbl. daily capacity, probably in the Sydney area. This will be a separate and entirely Caltex operation. It can utilize crude from the new Minas field in Sumatra which is due to come on commercial production this spring and is reported to be probably the most important foreign field discovered outside the Middle East since the end of the war.

These four scheduled Australian projects promise new refining capacity of approximately 113,000 bbl. daily in addition to the 21,000 bbl. daily existing at present. Three of them are located in the east to take crude from Indonesia and British Borneo. The fourth, Anglo-Iranian at Fremantle, is sited to receive crude from the Middle East where Anglo-Iranian continues to hold important interests in Iraq Petroleum Co., Ltd., and Kuwait Oil Co., Ltd.

LATIN AMERICA

Pemex to Build Lube Plant

Petroleos Mexicanos has received a 173,454,000-peso loan (about $20,000,000) from the National Savings Fund of Mexico for construction of a lubricating-oil and wax plant at the Salamanca refinery in the State of Guanajuato.

The plant will be the first in Mexico and of considerable importance to the country's economy in lessening its dollar expenditures. Mexico now spends about 70,000,000 pesos annually for lube-oil and paraffin from United States suppliers, including Socony-Vacuum Oil Co., Inc., and The Texas Co.

Sen. Antonio J. Bermudez, Pemex

director, said every effort will be made to begin construction by April. Reports in the industry are that the project is under study by the Petroleum Administration for Defense insofar as materials priorities are concerned.

Bermudez said the plant will produce 2,000 bbl. of lubricants daily, enough to supply the domestic market. At the start, he said, there will be a small surplus for export. Pemex hopes to have the plant in operation by the spring of 1954. Arthur G. McKee & Co., Cleveland, which built the original Salamanca refinery, has the contract for the new facilities.

Crude Line Planned

Creole will build second 26-in. From Ule to Amuay

CREOLE PETROLEUM CORP. is making preparations for the construction this year of a second parallel 26-in. crude-oil pipe line from Ule station on the east side of Lake Maracaibo to Amuay Bay in Venezuela.

Reports are that steel allocations for the project have been approved and initial deliveries of pipe are due in the second quarter. Construction will probably start during the summer. No contract for the project has yet been let, according to reports in the industry.

The 145-mile line will have one pump station and will be able to deliver approximately 100,000 bbl. daily to Amuay. At Amuay, Creole has ocean-shipping facilities and the Amuay refinery which has been running about 75,000 bbl. daily.

The new line will parallel but will be separate from the initial 24 and 26-in. Ule-Amuay project which Creole completed in 1949. This line has two stations and moves about 300,000 bbl. daily. The new line also will make an underwater crossing of the shallow but turbulent Gulf of Coro. This avoids the much-longer land route up the neck of Paraguana Peninsula along the Medinos Isthmus.

When the new Creole project is completed, three pipe lines will be in existence with a capacity of transporting approximately 635,000 bbl. daily out of the lake basin and directly to deep-water shipping points. This is roughly half of the total lake production.

Line nears completion.—A 30-in. line being built from Palmarejo to Cardon on Paraguana Peninsula is now nearing completion and is expected to be in operation by the beginning of April. The line is a Royal Dutch-Shell project in which Mene Grande Oil Co. and Texas Petroleum Co. have minority interest. It will move some 235,000 bbl. daily. Williams Brothers is handling most of the construction. Shell has a refinery at Cardon which is being expanded to 115,000 bbl. daily capacity by next year.

The economic advantage of these lines lies especially in the fact that for the oil transported they obviate the use of shallow-draft lake tankers which are now required to move lake production across the bar at the mouth of Lake Maracaibo. Production is then transshipped to larger ocean-going vessels at such points as Curacao and Aruba.

To dredge channel. — A project to dredge and maintain a deep-water channel out of Lake Maracaibo has long been promoted in Venezuela. Last year, the government obtained a total of Bs. 80,000,000 (about $24,000,000) from five oil companies for this work. Total cost of the project is estimated at Bs. 120,000,000 (about $40,000,000). The oil companies involved were the ones with lake production—Creole, Shell, Mene Grande, Texaco, and Richmond Exploration Co. The money was advanced as a loan to be repaid from future tolls on shipping through the channel.

The Venezuelan Government only recently named a three-man commission as the authority to carry out the project. Its realization, however, seems several years in the future considering likely delays in materials for an undertaking of this magnitude. Some questions have been raised in the past as to the feasibility of the project. However, its proponents contend it would be of widespread benefit to all types of development in the interior lake region.

Bolivian Interest

Majors little attracted by country's possibilities

SEVERAL studies have been made recently of the production prospects of Bolivia, but as far as is known, none of the major operators has made proposals for acreage.

Press reports from La Paz early this week said Standard Oil Co. (N.J.) representatives were discussing resumption of operations in the country, but it appeared this referred to marketing of products in the country. Jersey Standard's properties in Bolivia, including small production, were expropriated in 1937.

The possibility of reentry of foreign capital into the country's oil development arose from a law promulgated in November 1950. This allows concessions for various strictly wildcat areas. The state company, Yacimientos Petroliferos Fiscales Bolivianos, at about the same time offered to enter into drilling and development contracts for certain acreage under its control.

Y.P.F.B. obtained a total of $8,500,000 from the Export-Import Bank to build two refineries and a pipe line in the country, and is now asking an additional $3,000,000 which would allow development of field production. Present production of about 1,900 bbl. daily is insufficient to keep the refineries and line in continuous operation.

Loan sought. — The state company made application for this additional loan last April but the bank has made no decision as yet. Don L. Carroll, as consultant for the bank, made an on-the-ground investigation in Bolivia last year and recommended it be granted.

In an effort to increase production, Y.P.F.B. recently engaged Western Geophysical Co. for work in the country, and hired a West Coast petroleum engineer for advice. Concurrently, efforts to interest foreign capital are continuing. It is understood that the agency recently received offers for drilling on two blocks from a Buenos Aires exporter-importer.

Interest in Bolivia is more along the lines of developing large-scale production than in serving local market requirements. Production for export would have to be backed by major reserves since probably the most logical outlet would be an expensive pipe line to the Pacific Coast. The investigations made in Bolivia have been concerned with the probabilities of developing this kind of production.

MIDDLE EAST

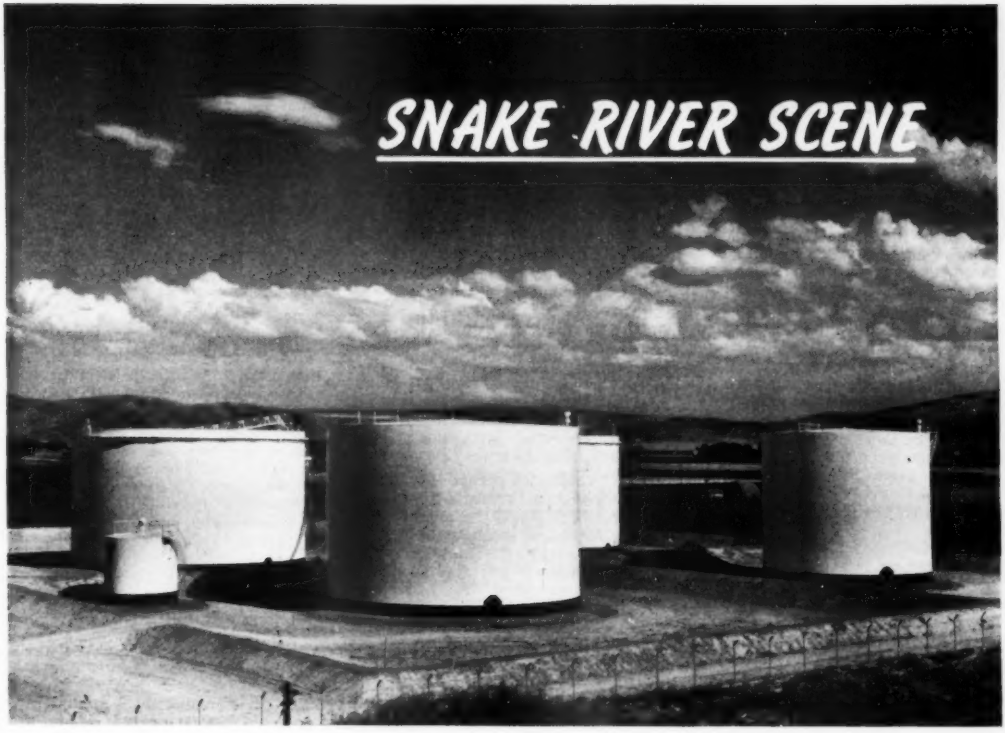
Court Authority Questioned

The authority of the International Court of Justice at the Hague to deal with the Iranian oil nationalization issue was disputed in a 61-page document presented to the court this week by Iranian officials.

Complaints of violation of international law by Iran were filed with the court last summer by the British. However, the fact that the Iranian Government even made an appearance before the court indicated a somewhat more moderate attitude. Originally, the Iranians ignored the court.

Oral hearings on the case are to be held later, and the Iranian minister to the Netherlands said that Iranian Prime Minister Mossadegh would appear personally at that time. Iran's challenge to the court's jurisdiction this week was made in a preliminary objection. Iran contends that the oil issue is an internal and domestic matter.

The determination of the Iranian Government to eradicate foreign interests in the country was further manifested this week when it became known that Teheran is requiring cultural centers of Britain, the United States, Russia, and India to close down. The decision applied to centers outside the Iranian capital. As far as



Horton* Tanks Symbolize Oil's New Frontier

The discovery and development of new oil pools in the Rocky Mountain states has transformed the entire area into a panorama of activity. Wildcat rigs—refinery towers—and storage tanks now dot a land where once only cattle and wheat dominated the scene.

On the picturesque Snake River near Burley, Idaho, the Horton storage tanks shown above serve the Utah Oil Refining Company. Three are cone roof installations while two other tanks are equipped with Horton Floating Roofs. Together they provide all the storage economies that modern design, fabrication and erection provide.

In storing gasoline or crude oil, Horton Floating Roofs *solve* three problems that often absorb profits. They greatly reduce or eliminate costly vapor losses—they protect the storage area from fire—and they reduce excessive corrossion inside the tanks.

Ask our nearest office for information or quotations on Horton Floating Roofs. They are built in three types—the Double Deck—the Pontoon—and the Pan to fit individual storage requirements. We also build Hortonspheres for efficient, economical high pressure storage of the more volatile hydrocarbons—Hortonspheroids and Hemispheroids to prevent excessive evaporation losses from hydrocarbons ranging in volatility from motor gasoline to natural gasoline—and Hortondome Roofs—to prevent evaporation losses from a single tank or several interconnected tanks during standing storage.

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Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 C & I Life Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615—1700 Walnut Street Bldg.
San Francisco, 4.....1544—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.
Washington 6, D. C.....1139 Cafritz Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
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Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo N.V., Amsterdam—O. Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704-C, Rio de Janeiro, Brazil

the United States was concerned, it meant closing three offices of the State Department's Information and Education Service.

Billionth Barrel Shipped

The billionth barrel of crude oil has been produced by Arabian American Oil Co. from its concession in Saudi Arabia.

This milestone in the company's operations was passed in the afternoon of January 4. The event came after 14 years of production and 5 years' previous exploration effort.

The Saudi Arabian production was discovered in 1938 at Dammam, and the first tanker was loaded the following year. Since the end of the war, with intensive development, the company's output has rapidly moved upward. During the last year, the increase has been particularly sharp, and Aramco's output went ahead of that of Creole Petroleum Corp. in Venezuela to give Aramco its present rank as the world's No. 1 producing company.

The greatest part of Aramco's billion barrels of production has come from Abqaiq field. Up to last July 1, this field had produced 652,846,633 bbl.

Other fields and their cumulative production to that time were: Dammam, 236,249,171 bbl.; Ain Dar, 22,871,888 bbl.; Qatif, 18,125,618 bbl., and Abu Hadriya, 9,579 bbl. At that time, the company had 109 flowing wells. Saudi Arabian proved reserves have been unofficially estimated at 12 billion barrels.

Tapline Shipments at Peak

The highest volume of oil loaded into tankers in any one month since the Trans-Arabian pipe line began operating in December 1950 was reported by Trans-Arabian Pipe Line Co. for December 1951.

During that month 10,393,758 bbl. of crude were loaded aboard 94 tankers at the Sidon, Lebanon, terminal for an average of 335,283 bbl. per calendar day. This record was accomplished despite the fact that the port was closed for a total of 167 hours during the month because of extremely bad weather.

During December 1951 Tapline transported 9,339,138 bbl. of crude from Qaisumah in Saudi Arabia to Sidon for an average of 303,198 bbl. per calendar day. Total crude delivered to Sidon during 1951 amounted to 107,503,904 bbl. and averaged 294,531 bbl. per calendar day.

During 1951, some 920 tankers were loaded with a total of 109,050,479 bbl. of crude for an average of 298,768 bbl. per calendar day. This average cargo of all ships was 118,533 bbl. The average loading time per ship was 7 hours and 57 minutes, and average loading rate per ship, 14,900 bbl. per hour.

Refining Stepped Up

European plants of A.I.O.C. running 160,000 bbl. daily

THE six refineries of Anglo-Iranian Oil Co., Ltd., in continental Europe are now processing crude at a rate of approximately 160,000 bbl. daily (8,000,000 tons annually).

A recent company announcement detailed the extent to which throughput in these plants has been increased in the industry-wide effort to replace the lost capacity of Abadan in Iran.

The new Antwerp refinery in Belgium, which began production last October, is now running about 40,000 bbl. daily. Anglo-Iranian is associated in this operation with the Belgian company, Petrofina.

The two French plants operated by Anglo-Iranian's French affiliate, Soc. Generale des Huiles de Petrole, now have a combined throughput of about 80,000 bbl. daily. At Dunkirk, where a new distillation and auxiliary units were commissioned in October, throughput is approaching 40,000 bbl. daily, against about 13,000 bbl. daily last year. In southern France, the L'Avera refinery is also running nearly 40,000 bbl. daily.

The Porto Marghera refinery at Venice, Italy, where Anglo-Iranian is associated with Azienda Generale Italiana Petroli, is now producing 25,000 bbl. daily. Its 1951 throughput was 13,800 bbl. daily. A new distillation unit went on stream at Marghera last December.

In Germany, the company's Eurotank refinery and the Schindler plant in which the company recently acquired majority interest, now show a combined throughput of about 16,400 bbl. daily, against 15,400 bbl. daily last year.

Middle East crude. — Anglo-Iranian pointed out that crude supplies for all these European refineries are coming from the Middle East. Antwerp and Dunkirk are at present processing Kuwait crude, and Porto Marghera and L'Avera are using crude from both Iraq and Kuwait. Schindler is being run on Iraq crude, and Eurotank on both Iraq and Qatar crude.

In addition to the six European refineries, Anglo-Iranian has other important refining interests in the United Kingdom and elsewhere in the Eastern Hemisphere aside from the Abadan refinery. The company's annual report last November said total refining throughput outside Iran was at that time at a rate of 280,000 bbl. daily compared with 160,000 bbl. daily at the end of 1950. In addition, the company has processing agreements for another 100,000 bbl. daily.

Expansion under way, including the new Kent refinery in England, should increase the total to more than 400,000 bbl. daily by the end of 1952, and urgent consideration is being given to the construction of other refineries.

Refining Record

Europe makes vast strides in expanding facilities

THE record performance of the refining industry in Europe in 1951 showed the results of plant-construction work which has been under way since the end of the war.

Reports from Germany and France listed sharp increases in total runs during the year. The all-time record throughput of French refineries was approximately 1,500,000 tons, or about 30,000 bbl. daily above what had been estimated would be achieved in 1952-53 by the Organization for European Economic Cooperation oil committee in its second report last summer.

French refineries last year processed 18,434,000 tons of crude compared with the previous high of 14,542,000 tons in 1950. These figures compare to 364,000 bbl. daily and 287,000 bbl. daily. In December, French refineries handled 1,780,000 tons, a rate of approximately 414,000 bbl. daily.

French consumption of motor gasoline, plus the so-called superfuel, last year amounted to an estimated 3,525,946 tons (97,000 bbl. daily) as against 3,071,340 tons (71,500 bbl. daily) in 1950. Consumption of gas oil in 1951 was 1,030,871 tons (21,100 bbl. daily) against 975,448 tons (20,000 bbl. daily), and fuel oil, 6,304,545 tons (115,000 bbl. daily) against 5,099,192 tons (93,000 bbl. daily).

France rehabilitation. — France had the largest refining industry in Europe prewar, and most of the work in the immediate postwar years was directed toward rehabilitation of existing plants. Expansion was carried out concurrently, and the more recent emphasis has been on improvements for operating efficiency and better quality products, such as, for example, catalytic cracking equipment. In 1938, French refineries had a throughput of 6,866,000 tons (136,000 bbl. daily).

In West Germany, refinery runs in 1951 showed an increase of about 42.5 per cent over 1950. The Mineral Oil Extraction and Refining Association in Hamburg estimated refinery throughput at 4,660,000 tons (92,000 bbl. daily) compared to 3,270,000 tons (64,500 bbl. daily) in 1950. Production of finished products amounted to 4,560,000 tons (90,000 bbl. daily) against 3,200,000 tons (63,000 bbl. daily) in 1950.

The association said that capacity of German refineries has increased to such an extent in recent years that the federal republic's requirements can be met almost completely from domestic sources. Imports of products have declined considerably. The continued rise in German crude production last year provided 28 per cent of the total crude oil run in West German refineries.

British gain.—The British refining industry which was almost negligible before the war has had the largest growth of any in Europe and is now on a par with that of France. Estimates place total refining capacity in the United Kingdom at the end of 1951 at some 20,800,000 tons (410,000 bbl. daily).

However, about 4,000,000 tons (79,000 bbl. daily) more capacity is scheduled to be added in the United Kingdom during the next 2 years. Largest single project is the now-building Kent refinery of Anglo-Iranian Oil Co., Ltd., which will ultimately handle 60,000 bbl. daily. Also due for completion some time this year is the 850,000-ton (17,000 bbl. daily) refinery of Vacuum Oil Co. at Coryton.

The second report of the coordinating OEEC committee last August forecast a total capacity for participating countries of 65,120,000 tons (1,290,000 bbl. daily). The countries include non-Communist Europe except Spain, and also Turkey. The estimates were immediately made obsolete for several of the larger countries, mainly because of the expansion which has taken place as a result of the nationalization and shutdown in Iran.

New Units Inaugurated

New facilities which have been constructed at the Berre refinery of Cie. de Raffinage Shell-Berre in southern France were officially inaugurated earlier this month by Andre Charon, president of the company, at nearby Marseilles.

The Berre refinery, ranking among the larger plants in Europe, has a capacity of 63,000 bbl. daily and 7,000 bbl. daily, cracking, including reforming. The enlarged refinery cost the equivalent of some $28,000,000.

Work is continuing at the plant. It is expected that a fluid catalytic cracking unit will be placed in operation in 1953. In addition, the Shell-St. Gobain organization has a solvents plant under construction at Berre to have a capacity of 7,500 tons annually.

Port facilities at the refinery have been enlarged to facilitate import of crude and shipments of finished products. Shell Berre has two other refineries, one at Petit-Couronne, capacity 35,000 bbl. daily, and at Pauillac, capacity, 6,300 bbl. daily, to be expanded to 15,000 bbl. daily by the end of this year. Crude comes 70 per cent from Kuwait, 15 per cent from Iraq, 8 per cent from Venezuela, with smaller quantities from Colombia and domestic French production.

Officials attending the inauguration luncheon at Marseilles included Marie-Louvel, minister of industry and commerce; Robert Andre, chairman of the French petroleum industry organization, Clive Howson, commercial attache of the British Embassy, and Dr. Oscar Brandsky, director of the petroleum and chemical division for the European assistance program.

Denmark Cores Indicate Oil

The first important indication of oil in Gulf Oil Corp.'s exploratory program in Denmark has been obtained in a well in southern Jutland near Toender.

Presence of oil was shown in cores taken from the well. The company said the well will be tested within the next 30 days to determine if commercial production is possible.

Gulf, through its Danish-American Prospecting Co., began work in Denmark in 1938 and resumed the program in 1946 after the war. The Danish Government raised questions concerning the concession's validity and in subsequent negotiations agreement was reached in February 1950 to transfer the concession to a company registered in Denmark and to give the government 5 per cent of the share capital without payment and also representation on the board.

The Danish exploration program is one of a half a dozen wildcat efforts Gulf is carrying on throughout the world. The company ranks as the most active American operator in foreign areas. It also is exploring in Tunisia, Sicily, Mozambique, British Honduras, Barbados, and Cuba.

International Briefs

The two principal United States companies which formerly marketed in China, Standard-Vacuum Oil Co. and California Texas Oil Co., Ltd., have received permission of the Communist Government of China to close their Canton offices. Movement of products into China was discontinued by the companies about 2 years ago, and their distribution properties subsequently taken over by the Communists. The Communist Government has prohibited voluntary liquidation by foreign companies.

Expanding refining capacity in the United Kingdom is giving a surplus of products for export. The Petroleum Information Bureau in London reports 1951 exports were valued at £31,392,000 (about $88,000,000) against a value of £13,551,000 in 1950. The figures exclude bunkers and a small quantity of reexports of finished products. Chief petroleum exports in 1951 were fuel oil, value £14,612,000; lubricating oil, £7,561,000; diesel oil, £2,832,000; motor fuel, £1,882,000; and gas oil, £1,698,000.

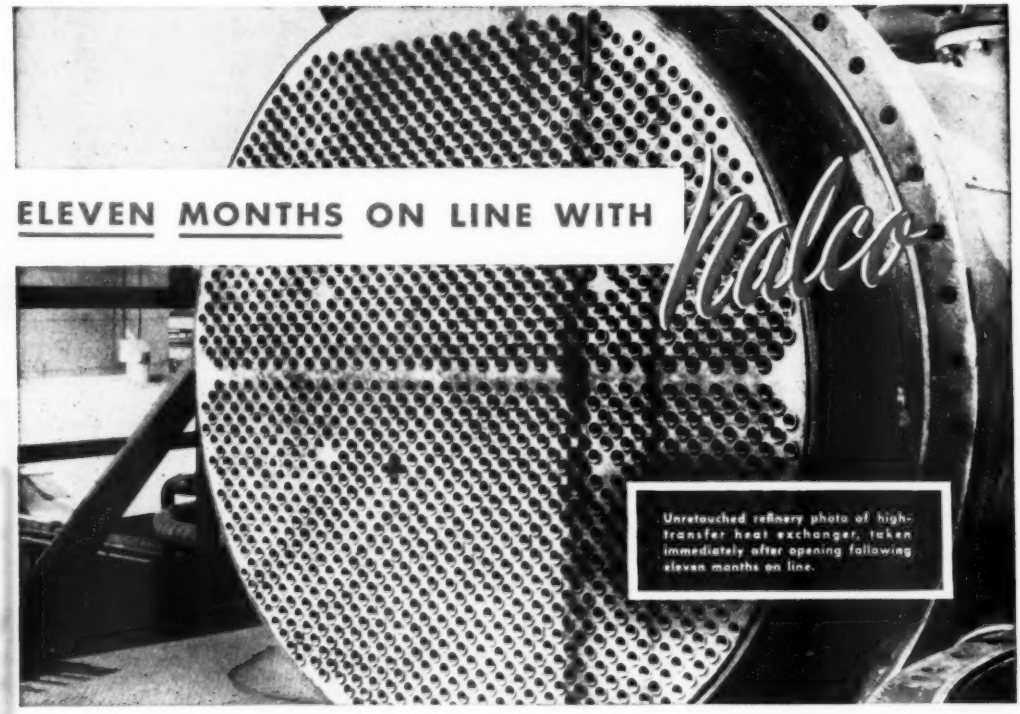
The final shipment of pipe for the 30 and 32-in. Kirkuk-Mediterranean line of Iraq Petroleum Co., Ltd., left Los Angeles Harbor recently aboard the British ship, S.S. Day Beam. Plates for the pipe were rolled at the Geneva steel plant in Utah, and the pipe fabricated by Consolidated Steel Corp. at its Maywood, Calif., plant. The line is now virtually completed from Banias, Lebanon, to Station K-3 and initial shipments are to begin in April. Work is continued to finish the K-3 to K-1 section. The final cargo of pipe from California was bound for Basra, Iraq, unloading point for pipe used on the K-3 to K-1 section.

Anglo-Iranian Oil Co., Ltd., has announced officially in London that it is studying the British Red Sea colony of Aden as the site for a new refinery. The Aden project is one of several planned by the company in an extensive program to meet the loss of the nationalized Abadan, Iran, plant. Aden is an important Eastern Hemisphere bunkering station.

Construction of new equipment for the production of lubricating oil has been completed and placed in operation at the Rijeka refinery in Yugoslavia, according to reports from Belgrade. The plant is expected to be able to meet all Yugoslavia's requirements.

A 17-km. pipe line to transport natural gas from the offshore Xicalango field in Campeche, southern Mexico, to Cuidad del Carmen will be placed in operation soon, according to Sen. Antonio J. Bermudez, director-general of Petroleos Mexicanos. The gas is to be used by the government power plant and by local shrimp-packing plants. Of the length of the pipe line, about 7 km. is across the Xicalango Bar and the Terminos Lagoon. The field was discovered about a year ago by Mexican American Independent Oil Co. on a percentage-of-production contract.

Gravity meter and geological work is now being carried out by D'Arcy Exploration Co., Ltd. (Anglo-Iranian) on a concession which it holds in southern and eastern Sicily. Further work will be done by the company to determine whether and where a deep test well should be drilled. Other companies with exploration blocks in Sicily are the Gulf Oil Corp. organization and Macmillan Petroleum Corp.



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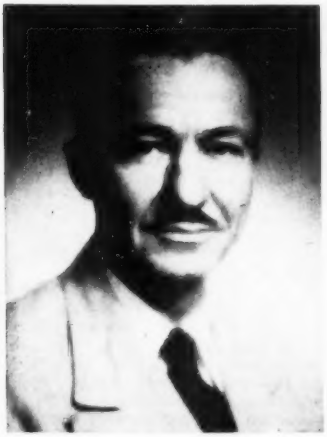
PERSONALS



Davis Honored

Humble executive named new president of A.A.P.G.

MORGAN J. DAVIS, vice president and director in charge of exploration of Humble Oil & Refining Co., has been elected the thirty-sixth president of the American Association of Petroleum Geologists.

Davis will take office March 27 following the annual A.A.P.G. meeting in Los Angeles.

Born in Anson, Tex., Davis first studied geology at Texas Christian University, Fort Worth, later transferring to the University of Texas at Austin.

Before completing his undergraduate work Davis accepted a position with Holway Engineering Co. of Tulsa in 1922; 2 years later he returned to the Austin campus. He received his A.B. degree in geology the following year.

Upon graduation, Davis joined the geological department of Humble and was assigned to reconnaissance and detailed structural mapping near Cisco, Tex.

After 4 years with Humble, Davis in 1929 joined Nederlandsche Kolonial Petroleum Mij. in the Dutch East Indies, but returned to Humble as district geologist in New Mexico in 1934. Two years later he became assistant division geologist of the Gulf Coast division and in 1941 was appointed company chief geologist.

In 1946 Davis was made manager of the newly created exploration department, and in 1947 he was selected to attend the Harvard University Graduate School of Business Administration.

He has been an A.A.P.G. member 26 years and currently is a trusteee of the association's research fund.

He holds membership in many scientific and professional societies, including the Geological Society of America, American Geophysical Union, American Institute of Mining and Metallurgical Engineers, and the American Geophysical Society.

Morgan J. Davis, vice president and director in charge of exploration for Humble Oil & Refining Co. at Houston, has been elected president of the American Association of Petroleum Geologists. Other officers elected to serve during the 1952-53 term include: **John G. Bartram,** consulting geologist for Stanolind Oil & Gas Co., vice president; **Robert H. Dott,** director of the Oklahoma Geological Survey, secretary-treasurer; and **Dr. Kenneth K. Landes,** University of Michigan department of geology, editor of the A.A.P.G. monthly bulletin of petroleum geology.

William J. McCarthy of Beverly Hills, Calif., and **John Carroll** and **W. J. Dennis,** both of Los Angeles, have formed Sundown Oil Co. The new firm is presently drilling a well in Soldiers Summit in Utah.

Ernest Le Quesne Herbert has been appointed to succeed **J. A. Oriel,** who has retired for health reasons as general manager of Shell Refining & Marketing Co., which operates in the United Kingdom. Herbert was with Anglo-Iranian Oil Co., Ltd., from 1923 to 1927. He subsequently went to Mexico with El Aguila and became head of the Minatitlan refinery. He has been in the head office of Shell Refining since 1939.

ERNEST HERBERT

A. G. Andrews has been named operating superintendent of Socony-Vacuum Oil Co.'s East St. Louis refinery succeeding **O. C. Johnson,** who was recently promoted to refinery manager.

A. C. Rubel, vice president of Union Oil Co. of California, has been elected president of Petroleum Production Pioneers. **Earl M. Daniels,** Hydril Co., was elected vice president. Other officers include: **G. S. Follansbee, Jr.,** Universal Consolidated Oil Co., treasurer; and **Richard Sneddon,** secretary. **A. E. Fowks,** retired Union official, was named honorary president, and **T. J. Hickey,** of Hickey Pipe & Supply Co., was made honorary vice president.

Charles E. Curry has been promoted to senior superintendent of the newly created Tri-State division of Sohio Pipe Line Co. The new office will temporarily be at Mount Vernon, Ill.

Lykle Schepers has been appointed managing director of the three main operating companies of the Royal Dutch-Shell Group. Schepers joined the Royal Dutch-Shell organization in 1926 and subsequently served in Romania, Indonesia, Argentina, Venezuela, and Netherlands New Guinea. He was interned by the Japanese from 1942 to 1945 but resumed his duties in Indonesia after the war. This was followed by assignments in the United States and Venezuela. Later he became head of the production department in The Hague, and in January 1951 was appointed a general proxy of De Bataafsche Petroleum Mij.

John R. Chestnolvick, formerly area production engineer for Continental Oil Co. in Fort Worth, Tex., has been promoted to assistant district superintendent of production at Hobbs, N. M.

G. W. Hewitt, traffic manager and engineer with El Paso Natural Gas Co., until he joined the Petroleum Administration for Defense last year, has been appointed assistant director of the gas facilities division.

C. H. THAYER

Clarence H. Thayer, vice president in charge of manufacturing of Sun Oil Co., has been elected a member of the board of directors of Houdry Process Corp. **Chalmer G. Kirkbride** was elected president of the corporation and **Claude C. Peavy** was named vice chairman of the board.

Clarence E. Rabb, assistant foreman for Magnolia Petroleum Co. at Shreveport, has been promoted to production foreman and moved to the firm's Brownfield, Tex., producing district.

Joseph D. Harnett has been named assistant manager of the transportation department of Standard Oil Co. (Ohio). He has been with the firm since 1941 and has held posts as vice president and director of Sohio Pipe Line Co., Sohio Southern Pipelines,

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Inc., and Sohio Southwestern Pipelines, Inc. Harnett will be responsible for all Sohio's transportation activities while Spahr is in Washington as director of supply and transportation division of the Petroleum Administration for Defense.

A. C. Long, executive vice president of The Texas Co., has been awarded the medal of Officier de l'Ordre National du Cedre, by the president of the Republic of Lebanon.

R. E. FRIEDMAN

Robert E. Friedman has been appointed assistant to **P. S. Magruder,** executive vice president of General Petroleum Corp. Friedman joined General Petroleum in 1950 after a year as assistant to the president of Trunkline Gas Supply Co. Previous to that he had served in the oil and gas division of the Department of the Interior, rising to the post of acting director.

Rex Smith, formerly field geologist for Humble Oil & Refining Co. in the San Joaquin Valley area, has been transferred to Los Angeles as acting production geologist. **Charles Delancey** replaced Smith at Bakersfield, Calif.

M. A. Sherwood has been appointed production manager for the Midland, Tex., area of Shell Oil Co. He is to serve in that position during the absence of **M. C. Brunner** who has been granted a 1-year leave of absence to handle an assignment in Washington with the Petroleum Administration for Defense. **J. N. Gregory,** formerly division production superintendent of Shell's Long Beach, Calif., division has been moved to Midland to replace Sherwood as area production superintendent.

John B. Hanna, formerly head of the mechanical and construction division at Esso Standard Oil Co.'s Bayway refinery, Linden, N. J., has joined Standard-Vacuum Oil Co. as general superintendent of the new refinery to be built at Durban, South Africa. He is succeeded at Bayway by **John H. Bannon,** who supervised the Paratone plant. In the Bayway refinery laboratory, **Caleb E. Hodges** has been named laboratory head; **Clifford E. Gustafson** has been promoted to head the Paratone and additives division of the chemical products department; and **Harry T. Rice** succeeds Gustafson as head of the chemical products laboratory.

Waring Bradley has resigned as staff man at the Permian Basin Geological Laboratory and has opened offices in Midland, Tex., as a consulting geologist.

M. C. Alcorn, assistant manager of Shell Oil Co.'s pipe-line division at Los Angeles, is on temporary assignment with Shell Pipe Line Corp. in Maracaibo, Venezuela. After several months there, where he will assist in the design of a heated-oil pipe line, Alcorn will return to the Los Angeles office.

Albert L. Nickerson, Socony-Vacuum Oil Co., Inc.; **Edward F. Johnson,** Standard Oil Co. (N. J.); and **A. E. Thayer,** California Texas Oil Co., Ltd., have been elected directors of the National Foreign Trade Council in New York. Holdover directors include **W. A. Berryman,** Gulf Oil Corp.; **W. J. B. Dixon,** The Texas Co.; and **J. C. Sample,** Standard-Vacuum Oil Co.

Henry G. McBurney has been named general superintendent of Esso Standard Oil Co.'s Baltimore refinery. He succeeds **William J. McClintock,** who has asked to be relieved of his duties because of ill health. **William J. Sheridan,** formerly technical assistant to the process superintendent, has been named to succeed McBurney as assistant general superintendent.

Cecil Massey has resigned as Rocky Mountain manager for Ryan Oil Co. to open offices at Denver as an independent operator and lease buyer. **Jerry Ryan** has assumed managership for Ryan Oil in the Rockies.

H. W. PATTISON

Henry W. Pattison, an assistant to the vice president of the transportation department of Standard Oil Co. (Ohio), has been elected a director and vice president of Sohio Pipe Line Co. **Harry S. May,** assistant to the vice president in charge of finance for Standard, was also elected a director. Pattison, who joined Ohio Standard in 1946, was elected secretary and assistant treasurer of Sohio Pipe Line Co. and Sohio Southern Pipelines, Inc., in 1950. May was secretary and treasurer of Adams Oil & Gas Co. at Houston when Sohio purchased that firm in 1944.

Buck Wilson has opened offices for El Capitan Oil Co. at Denver. He was formerly at Midland, Tex.

L. E. Heaton and **W. W. Morford, Jr.,** Shell Oil Co., seismologists formerly stationed at Oilfields, Calif., have been transferred to Sacramento, Calif.

A. W. Gentry has resigned as superintendent of operations for Long Beach Oil Development Co., Long Beach, Calif., to become manager of field operations for Fullerton Oil Co., Pasadena, Calif.

STEERING COMMITTEE.—Members of the steering committee for the second annual meeting of the Gulf Coast Association of Geolcgical Societies are, seated left to right: Charles De Blieux, consultant; W. H. Gorman, Royal Oil & Gas Co.; W. M. Chaddick, chairman, Sun Oil Co.; Leslie Bowling, consultant; Fred M. Schall, Jr., Texas Gas Transmission Corp. Standing, left to right: D. D. Utterback, Freeport Sulphur Co.; R. F. Story, Shell Oil Co.; Mack Hays, consultant; W. H. Wallace, Jr., La Gloria Corp.; Jean S. Spencer, General Geophysical Co. The 1952 meeting will be held November 6-8 in Corpus Christi.

PERSONALS

Roy O. Campbell has been appointed chief chemist of British American Oil Co., Ltd. He joined B-A in 1931 as resident chemist and has been technical assistant in the marketing department since 1949.

J. M. C. Ritchie has withdrawn from the partnership of Jackson, Douglas & Ritchie and has opened offices in Midland, Tex., to operate independently. The new name of the partnership is Jackson, Douglas & Whitaker, Ltd. The partners are **Frank M. Jackson, L. W. Douglas, Jr.,** and **Robert C. Whitaker,** who was associated with the partnership prior to Ritchie's withdrawal. The concern is engaged in a general oil exploration and development program in the Permian basin.

James S. Sayer, production superintendent for Standard Oil Co. at Los Angeles, has been honored as Man of the Year by the Chamber of Commerce.

C. H. Murphy, Jr., has been named president of the newly organized Amurex Oil Development Co. The new firm, which will prospect for oil and natural gas in the western provinces of Canada, is an affiliate of Murphy Corp., and Ashland Oil & Refining Co.

I. C. Huff, Jr., has been named assistant to the executive manager of the Independent Petroleum Association of America. In his new post he will assist with I.P.A.A. administrative duties and direct activities of its field staff which represents the association in the various oil producing states and areas.

Melvin Hall, president of Melvin Hall Oil Co. of Noel, Mo., has been elected president of the Missouri Petroleum Association, succeeding **Harry E. Milton,** president of Milton Oil Co. Other new officers include: **B. A. Brown,** of D. S. Caldwell Oil Co., vice president; **John Rupp,** of John Rupp Oil Co., secretary; and **Roy W. Blair,** of Lincoln Oil Co., reelected treasurer. **Robert W. Hadlick,** executive secretary, also was reelected.

Jess Anderson, repressuring plant foreman at Delaware, Okla., for Sinclair Oil & Gas Co., has been promoted to construction foreman. Other production department promotions and reassignments include: **James A. Robertson,** roustabout at Delaware, promoted to intermediate petroleum engineer; **Robert R. Marmor,** roustabout at Delaware, promoted to intermediate petroleum engineer; **Joseph A. Buland,** intermediate petroleum engineer at Oklahoma City, promoted to senior petroleum engineer and transferred to Delaware; **Thomas C. Head,** district foreman at Covington, Okla., transferred to Ardmore, Okla.; **Wayne C. Hixon,** assistant district foreman at Ardmore, transferred to Stroud, Okla.; **Billy R. Burruss,** assistant district foreman at Stroud, transferred to Lindsay, Okla.; **Dawson W. Engle,** assistant district foreman at Lindsay, promoted to district foreman and transferred to Covington; and **Clayton Walker,** junior petroleum engineer at Kiefer, promoted to international petroleum engineer.

G. CUNNINGHAM

George M. Cunningham has been named to head the newly formed American Overseas Petroleum, Ltd. The new corporation is jointly owned by Standard Oil Co. of California and The Texas Co. Cunningham has served as general manager of Standard's exploration department since 1946. He had previously been chief geologist in the company's producing department. **O. F. Van Beveran** has been named by Standard to replace Cunningham as general manager of exploration.

C. D. Atchison has been promoted to district exploration manager in West Texas for British-American Oil Producing Co. He replaces **C. H. Cooper** who resigned to become associated with **F. Kirk Johnson** of Fort Worth, Tex.

W. H. Fowler, mechanical engineer in Shell Oil Co.'s Tulsa area, has been transferred to Midland, Tex., as gas engineer. Other Shell transfers include: **B. O. Carlson,** transferred from Tulsa to Hobbs, N. M., as mechanical engineer; **J. L. Ward,** transferred from Houston to Hobbs as mechanical engineer; and **A. Glover,** drilling foreman, transferred from Hobbs, to Odessa, Tex.

V. W. Ischie, operating superintendent of Sinclair Refining Co.'s East Chicago refinery, has been granted a leave of absence to become director of foreign refining for the Petroleum Administration for Defense. **E. W. Griscom,** operating superintendent at the Marcus Hook refinery, has been transferred to East Chicago to succeed him. **Ira T. Fritz,** who was assistant superintendent at Marcus Hook, moves up into Griscom's former position and **Howard Thompson,** formerly chief technician, succeeds Fritz. **David Stewart,** who was assistant chief technician, is now chief technician.

Michael Bielaczyc, formerly geologist with Illinois Mid-Continent Co., has joined the staff of Iley B. Browning & Sons at Henderson, Ky.

Thomas C. Wilson, staff geologist for Gulf Oil Corp. at Tulsa, has been transferred to Casper, Wyo., as area geologist.

M. E. Bay has been promoted to district superintendent of Magnolia Pipe Line Co.'s North Texas district at Wichita Falls replacing **H. F. Smith,** who has retired.

D. R. Croft, assistant superintendent of compressor stations for Transcontinental Gas Pipeline Corp. at Houston, has been appointed to head the new engineering research unit. **Howard L. Cline** will succeed Croft.

Albert H. Reschke has been appointed superintendent of gas measurement engineering operations for New York State Natural Gas Corp.

Frank Forsyth, division production superintendent for American Republics Corp. of Houston, has been transferred from San Angelo to Midland, Tex. Others at San Angelo who are making this same change, include: **A. L. Beesley,** assistant division production superintendent; **Jack Chain,** petroleum engineer; **Ben L. Thomason, Jr.,** division geologist; **John H. Lydecker,** district geologist; and **Billy Wells, Dean Crafton,** and **Richard B. Oleson,** geologists.

DEATHS

George W. Reed, 61, who had been with The Texas Co. for more than 25 years, died February 3 in Tulsa.

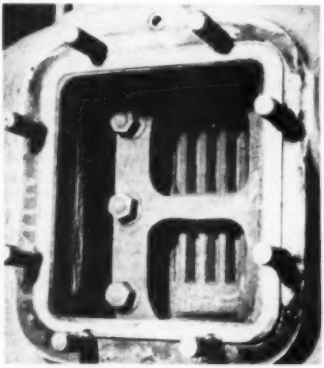
A. F. Kyle, 58, a veteran employe of Carter Oil Co., died January 31 at Magnolia, Ark.

Ward Blackburn, who had been president of Vernon Tool Co., Ltd., Alhambra, Calif., for the past 15 years, died January 27. He had been active in the California Natural Gas Association and the Western Oil and Gas Association.

Harry J. O'Rourke, 73, founder and chairman of the board of directors of Marquette Petroleum Products Corp., died recently at St. Petersburg, Fla.

Volney Hilford, assistant purchasing agent for Sinclair Oil & Gas Co., and **Martin Lobitz,** assistant treasurer of the firm, were killed February 3 in a five-car crash west of Severy, Kans.

BEFORE.—Suction valve after 38 days' operation without oil injection.



AFTER.—Suction valve after 43 days' operation with oil injection.

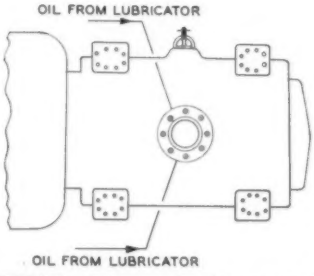
Cleaner Compressors

Force-Feed Lubricator Cuts Down Carbon, Sulfur Deposit

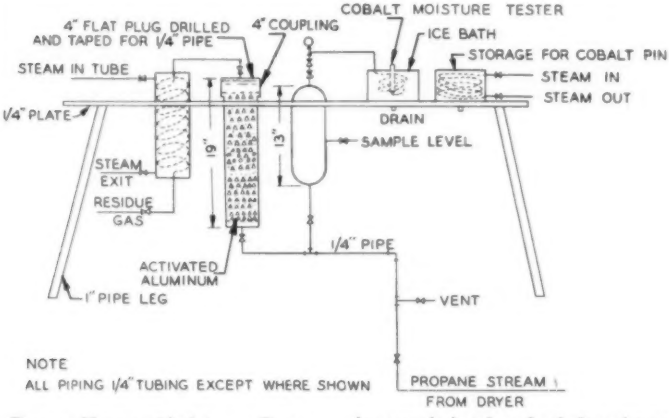
HUMBLE OIL & REFINING CO., Houston, has adapted a forced-feed lubricator to inject a small amount of lubricating oil into the suction line of compressors. This results in formation of an oil film on valves and walls of the suction passages, which prevents carbon and sulfur deposits from adhering thereto.

Without the film of lube oil, in some cases deposits build up within 30 days. Some valves have been found plugged, and others with less than one-half of their effective area open.

Cutting down on deposition of carbon and sulfur increases efficiency and reduces maintenance costs.



DETAIL.—Diagram showing points of entry of oil from force-feeder.



Dryer Keeps Moisture Out Of Sample Bomb, Tester

A dryer has been built by H. L. Baber, chief operator for Gregg-Tex Gasoline Corp., Longview, Tex., to dry sample bomb and cobalt moisture tester apparatus on propane loading lines.

It was found that during damp weather the cobalt tester and piping would collect enough moisture to give false readings. With the additional equipment piping, sample bomb, and cobalt tester stays dry at all times. It was built principally of simple steel plate and pipe fittings *(see drawing)*.

To test propane, a sample line is opened into the sample bomb at the bottom until the liquid reaches the desired level. Moisture tester is connected to the top and test is run per N.G.A.A. procedure. After the moisture test, the bomb is vented, cobalt bromide tester disconnected, and placed into the storage dryer, where heat from the steam coil keeps it dry.

The sample bomb is dried with hot residue gas from the heater, which passes through the activated aluminum bed and then through the sample bomb and piping connections for the cobalt bromide moisture tester.

Since this apparatus was installed the operators do not have any trouble with moisture in the equipment due to weather conditions.

Details of the dryer were given at the "Operating Kinks" session of N.G.A.A. held in Tyler, Tex.

Position Indicator

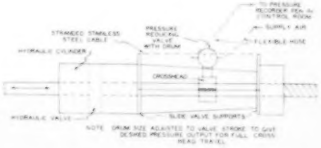
It shows reading of valve controlling spent catalyst

A METHOD for showing position of the slide valve controlling spent-catalyst flow has been applied to operation of one of the cracking units at Cities Service Refining Corp.'s Lake Charles, La., refinery.

The position indicator was developed in the refinery's instrument department. The device indicates and records the hydraulically operated slide valve's position remotely and is independent of its controlling mechanism.

The principal component in the indicating system is a pressure-reducing valve which is attached to the slide valve's crosshead. This commercial type P.R. valve is equipped with a drum affixed to its adjusting mechanism such that when the drum is rotated in one direction pressure drop across the P.R. valve decreases and when rotated in the opposite direction pressure drop increases.

A stranded cable, with each end attached to a support on the slide valve, is looped once around the drum to impart the force which rotates the drum when the slide valve crosshead moves along its guides.



Air.—Air to and from the P.R. valve is transmitted via hose to allow freedom in its movement throughout travel of the slide valve. The outlet of the P.R. valve connects with a remotely located pressure recorder which has been calibrated for relative position of the slide valve.

In addition to indicating position of the slide valve, the device serves to call attention to wear on the slide valve. This shows up on the chart as an increase in the slide valve's travel at closed position.

The system is easily accessible, inexpensive, simple, and in no way interferes with operation of the slide valve proper.

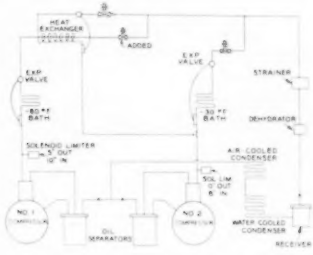
Flow Revamped

Pour-test bath separation eliminates downtime effect

THE flow in a single refrigeration system serving —80° F. and —30° F. baths on a pour-test machine in a physical testing laboratory has been revamped in one Texas refinery, to separate cooling of the two baths.

As a result, downtime on one bath will not affect the other, since they operate as two separate and distinct units.

The following steps were necessary to effect the change:



Piping.—1. An additional oil separator was added so that each compressor would have a separate oil unit.

2. The oil equalizers were disconnected.

3. Output of the No. 1 compressor was discharged into the air-cooled condenser instead of the No. 2 compressor.

4. Separate solenoid valve was installed in liquid line for —80° F. bath (in drawing, note expansion valves for —80° and —30° F. baths).

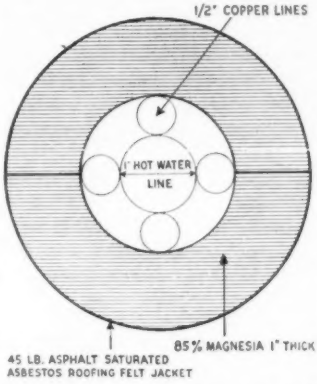
Electrical.—1. Circuit was installed for the solenoid mentioned above.

2. Solenoid limiter was installed for compressor on the —80° F. bath.

How to Prevent Freezing of Lines While Taking Samples

How to prevent condensation and freezing while sampling gas was the problem faced recently by Jersey Central Power & Light Co. Continuous sampling of gas and measurement of B.t.u. value is employed by this company to adjust composition of the gas to a fixed, predetermined B.t.u. value.

Because the gas is measured on a saturated or wet basis, condensation



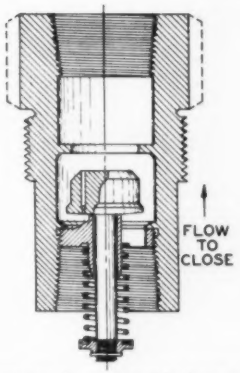
and freezing must be prevented at all costs. The copper sampling lines were therefore grouped around a 1-in. tracer liner containing hot water (150°-180° F.). In consultation with engineers from Magnesia Asbestos Insulation Co., it was decided that heat insulation would be an efficient means of keeping the gas lines from freezing.

Sectional 85 per cent magnesia pipe insulation, 1-in. thick, and large enough in diameter to enclose the copper lines and the tracer line, was wired on with No. 14 gage iron wire loops. The insulation was finished with a 45-lb. asphalt-saturated asbestos-felt jacket secured with copper wire. Joints were lapped a minimum of 3 in. and sealed.

Phillips Nonchatter Valve Uses Throttling-Type Disk

A recent accomplishment in excess-flow-valve evolution is Phillips Petroleum Co.'s 1519C nonchatter valve, which is designed for use in L.P.G. tanks for protection of top outlets, and which can also be used in end outlets and bottom outlets *(see drawing)*.

It was found that excess flow valves in pipe lines and eduction pipes of tanks would chatter under certain flow conditions due to liquid "hammer" effect. This chattering or



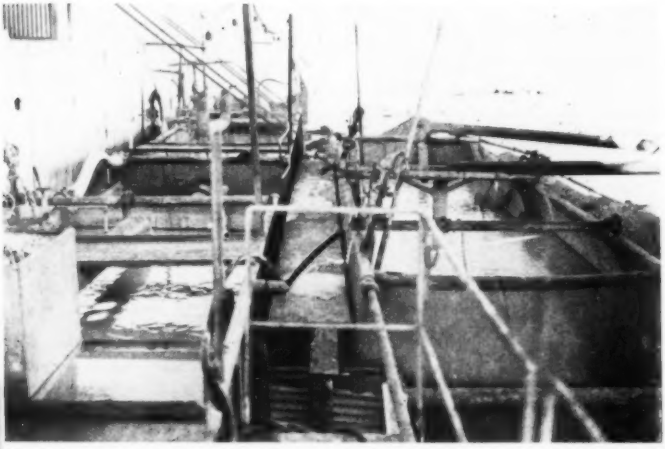
hammering is undesirable because of noise, damage often inflicted on the valve, and temporary disruption of operations. Another objection to a chattering valve is that it will often fail to stay closed in an emergency, especially at low pressure.

After much research, including extensive flow tests in order to diagnose the cause of chattering, Phillips engineers developed the throttling-type disk which closes without chattering at unusually low upstream pressure. In most cases the upstream or tank pressure could be as low as 10 psig.

The same principle is used in excess-flow valves of the pipe-line style, known as Phillips Petroleum Co. 1519A2.

Frame for Engine Heads

This frame, designed by Station Supt. William C. Dreinhofer and Assistant Supt. Lester Dean Smith of Tennessee Gas Transmission Corp.'s Agua Dulce, Tex., station, makes engine-head handling easier. It is displayed by Oskar Austreim, plant repairman.



SIDE BY SIDE.—Mud tanks on Corbett Drilling Co. rig are set beside each other so that jets and mud guns can be operated from a narrow catwalk between the vessels.

Handy Mud Lines

They save rigging-up time, provide similar installations each time Corbett Drilling Co. makes new hole location

ALL of the hydraulic lines are incorporated within the framework of the mud tanks on a rig owned by Corbett Drilling Co., Tulsa, to save rigging time and provide for similar installations each time the rig is set up for a new hole.

Pump discharge is arranged to connect directly through short lengths of hydraulic hose to the main line leading to the derrick standpipe. This line lies beneath the mud tanks, and risers at the end facing the pumps are provided with standard unions for rigging up. When two mud tanks are used in series the hydraulic line is broken out or connected with a standard union between the tanks so that the flow is continuous.

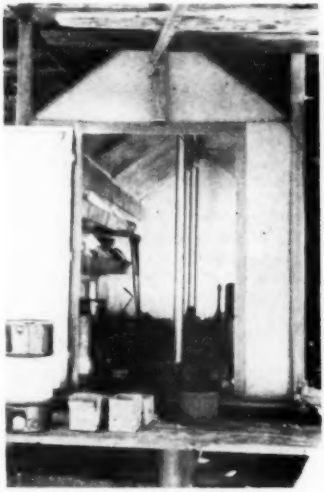
Reinforced.—Each tank is finished at the top rim with piping, which serves as reinforcement, and which provides a manifold to divert fluid to guns, sediment jets, and other service lines. Connections are provided at one point to deliver mud under pressure to the service lines. This point is at the end of the lead, or first tank, in the series.

Utility mud flows through these connections to the pipe around the top edge of the tanks, and is led to the other tanks through a piece of hydraulic hose connecting the rim lines of the first tank to the next in the series.

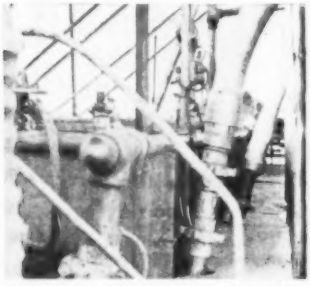
Not solidly connected. — While the main hydraulic line from the pumps to the standpipe lies within the structure supporting the tanks themselves, it is not attached solidly to the framework. Therefore it is not necessary to place the second tank at an exact distance from the other, and the short piece of hydraulic hose takes the slack of positioning.

The system, Corbett claims, has been found to be a time saver, and is adequate for operation of a rig drilling 12,000-ft. depths.

Corbett Drilling is headed by Copartners H. L. and R. I. Corbett. Drilling superintendent for the firm, which has five rigs, is C. H. Gaston of Odessa, Tex.



TOOL HOUSE.—View showing interior of tool house built into substructure which supports drilling engines on McAlester Fuel Co. rig.



SERVICE LINES.—They handle mud under pressure for jets and agitation guns, and are connected between separate tanks in series with short lengths of hydraulic hose.

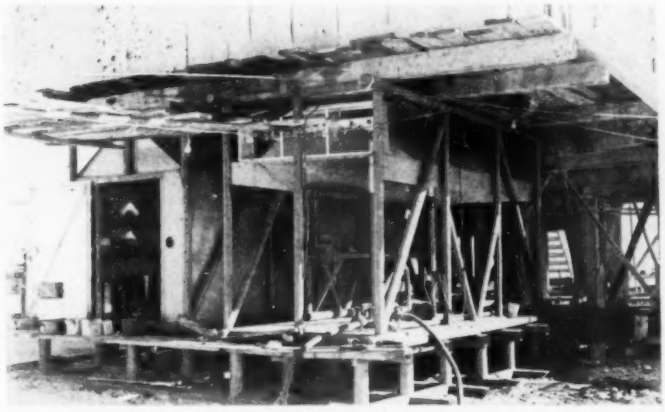
BUILT-IN.—The firm builds the hydraulic mud line into mud-tank structure so connections can be made easily with short sections of flexible hose from pump discharge to header.

Rig Space Utilized

Substructure provides tool house, safe working area

THE substructure on a drilling rig of McAlester Fuel Co. has been put to the added use of serving as space for repairs to pumps and other rig equipment, and as a tool house where spare parts are stored. The rig is now drilling in New Mexico.

The substructure has been designed with three major sections, one made up of a pair of fabricated cribbing members which are set directly on the ground, or on a mat made of planking, and the other two, identical as far as the frame is concerned, made of welded pipe.



ALL SPACE UTILIZED.—The entire substructure space on McAlester Fuel Co.'s rig has been converted into utility space. Left is tool house, and right is working area for repairmen.

Shape of these units is a rectangular open box, provided with heavy studding and bottom and sills. These units rest on the pair of cribbing members, and after being leveled provide the necessary foundation for the drilling engines.

Metal roof.—One section is devoted to a working space with benches and vises and necessary tools for working on repairs and rig maintenance. A sheet-metal roof covers the entire working area so that refuse from the engine floor—such as wash water—will not contaminate the area where repairs are to be made.

The second section is a tool house where spare parts are stored. It is provided with a sheet-metal roof, siding, and a door which can be locked.

The ridge pole of both buildings is the center sill at the top of the structure which supports the drilling engines. Posts midway between the ends are improvised studding for the tool benches in the first, or open-sided building. Those in the second section are used as supports for lighting fixtures.

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The Journal pays cash for all acceptable items. Address yours to: Editor, "On the Job," The Oil and Gas Journal, Box 1260, Tulsa, Okla. Photographs and manuscripts will be returned if requested.

Trouble, Time Savers

Both a trouble saver and a time saver are illustrated in this photograph, taken on Houston Oil Co.'s lease in Conroe field, Texas. The trouble saver: A "gateless gate" which succeeds in fooling cattle. They just don't seem to bother about figuring out how to get inside the tank's fire walls. The time saver: That little sign on the fence post. It's a signal by which pumper lets gager know when tank is ready to run. Gager drives by, notes sign, orders tank put on line. When he returns, if sign is down he knows tank is empty, and thus gives pumper a shut-off.

Pipe-Line Pig . . . Caught in New-Type Trap

The 415-lb. pipe-line pig at left, costing about $1,800, enters a section of Northern Natural Gas Co.'s pipe line to remove depositions within the line. Traveling at approximately 60 m.p.h. under 15 psi. pressure, the pig is caught in a new-type catch joint, at right. The trap, installed in place of a section of the line, is made from a joint of pipe, and is slotted. Gas pressure spends itself through openings when pig enters. After purging operations, crew removes the blow-joint, lowers a regular section of pipe in place, and rewelds the line.

Union Oil Co.'s new 4,000-bbl.-daily asphalt plant, near Edmonds, Wash. Santa Maria Valley crude is processed to asphalts.

High Degree of Instrumentation Achieved At Union Oil's New Asphalt Plant

by D. H. Stormont
West Coast District Editor

Complete line of paving and cutback asphalts and road oils manufactured at Edmonds, Wash.

IN order better to supply the growing demand for asphalts and road oils in the Pacific Northwest area, Union Oil Co. has erected a 4,000-bbl. per day asphalt plant at Edmonds, Wash., near Seattle. Feature of the new plant is the unusually high degree of instrumentation and other provisions for automatic operation. Self-sufficient except for purchased electric power, the plant consists of necessary heating, fractionating, and blending facilities to produce a complete line of paving and cutback asphalts and road oils.

Low-gravity Santa Maria Valley crude serves as charge stock to the plant, which was constructed adjacent to Union's refined-products water terminal. About 90 per cent of the charge is recovered as asphalt bottoms or distillate products needed in the blending operations. The remainder, consisting of gasoline and diesel cuts, is accumulated for shipment by tanker to either Union's Oleum or Los Angeles refinery.

About 80 per cent of the time the plant operates to produce an 85-100 penetration asphalt. The bottoms, however, can range from a 40-50 penetration asphalt to SC-6 road oil. From these bottoms and the SC, MC, and RC solvents, 4 grades of asphalt, and 20 grades of cutback asphalts and road oils are produced.

Plant operation.—Crude is charged to the fuel-oil- fired heater at a pressure of about 250 psi. En route to the heater the crude is preheated to about 132° F. by the lube cut produced in the fractionating tower, and then to about 285° F. through heat exchange with the asphalt bottoms.

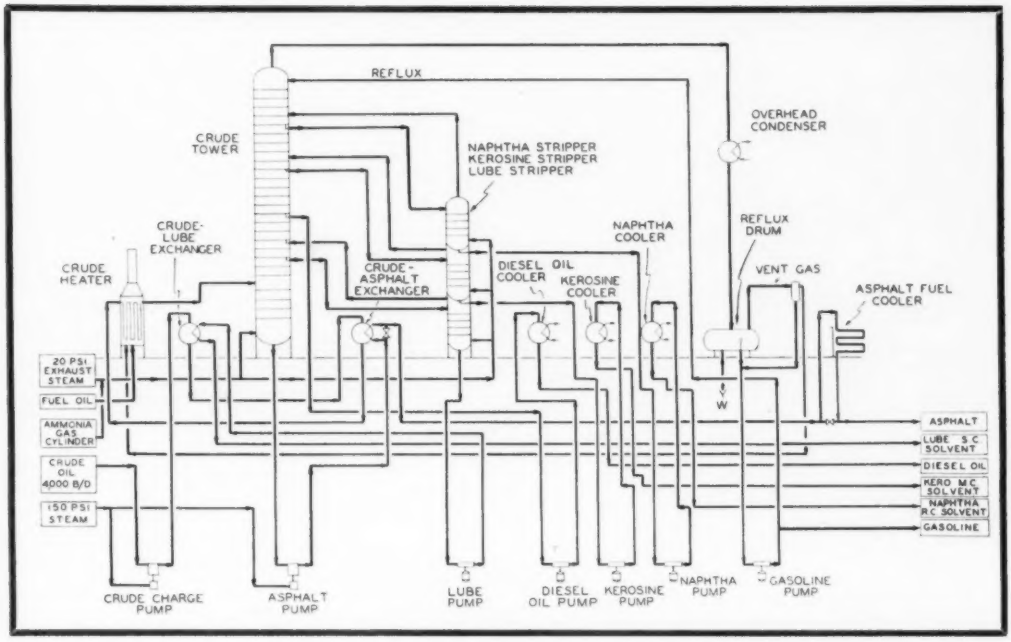
Just before entering the heater the preheated crude strain passes through a pressure controller. This valve and its integrally mounted pilot act to hold a 200-psi. back pressure on the crude preheating system, thereby suppressing vaporization of water contained in the crude-oil charge. Inorganic salts dissolved in the water consequently are held in solution, thus minimizing deposits on the hot surface of the preheat exchangers.

The crude-oil charge leaves the heater at a temperature of about 650° F. and at approximately 15 psi. Outlet temperature of the charge automatically is controlled by the pressure held on the fuel oil at the heater burners. This is accomplished through a temperature recording-controller acting to reset the control point of a pressure-indicating controller. The latter, in turn, controls pressure on the fuel oil at the burners by actuating a control valve in the fuel-oil line.

Partially vaporized crude from the heater enters the fractionating tower as shown in the accompanying flow diagram. The tower, essentially operated at atmospheric pressure, contains 22 fractionating trays and 4 stripping trays. Stripping is accomplished with 20-psi. steam.

Overhead product, essentially gasoline vapors and stripping steam, pass to two shell-and-tube exchangers where they are condensed and cooled. From there flow is to the reflux accumulator where water is removed by means of a water-gasoline interface controller throttling a motor valve in the water-disposal line.

Gasoline from the reflux drum flows to the suction of gasoline pro-



Process flow scheme of the new Edmonds asphalt plant.

duction and reflux pump. The volume necessary to maintain desired tower top temperature, about 70 g.p.m., is refluxed back over the tower.

Gasoline in excess of reflux requirements is metered by a board-mounted flow controller and leaves the plant stream. Net production to storage is regulated by a level controller installed on the reflux accumulator, the controller throttling a motor valve in the gasoline production line to maintain a constant level of gasoline in the reflux drum.

Naphtha, kerosine, and lube cuts are run to their respective sections in the stripping tower, which is divided into three identical four-tray compartments by internal heads. Steam at 20 psi. aids stripping of undesirable light fractions from each cut. Strippings are returned to the fractionating tower, while the stripped side cuts are removed, cooled, and run to storage.

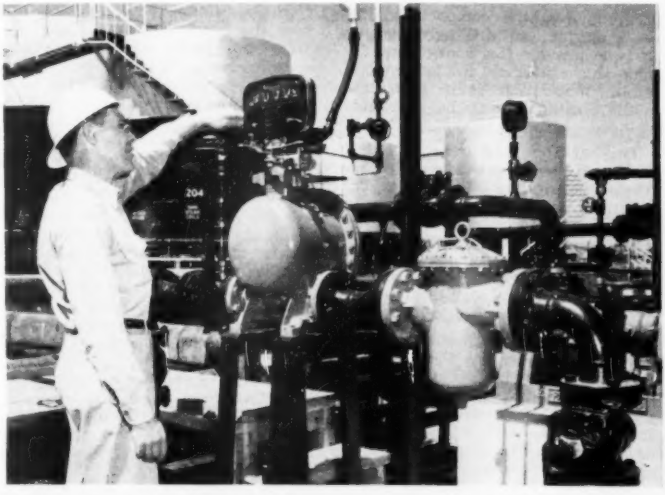
The diesel side cut is not stripped, since it is a slop cut taken to improve the character of the lube cut. It thus is cooled immediately after leaving the tower and run to storage.

Asphalt is removed from the bottom of the tower through a level controller. It is then picked up by a horizontal duplex steam pump and discharged into the asphalt-crude heat exchangers. Leaving these exchangers at a temperature of about 400° F., the asphalt is further cooled in a submerged pipe water cooler, and then is run to storage.

Product blending. — While paving grades of asphalt and SC-6 road oil can be produced directly for the crude tower, all cutback asphalts and road oils except SC-6 are blended from solvent stocks in storage. To simplify blending operations, however, bottoms from the crude tower normally are blended to the desired grade in the rundown line from the tower. In this blending the bottoms rate is not metered directly, but is obtained by difference since the crude charge rate and the overhead and sidecut rates can be determined.

The quantity of blending solvent required to produce the desired product is pumped directly into the

(Continued on page 115)



Displacement meters equipped with air-operated shutoff valves and microswitch controls simplify blending of cutback asphalts and road oils. Meters automatically halt flow of solvent on delivery of predetermined quantity.

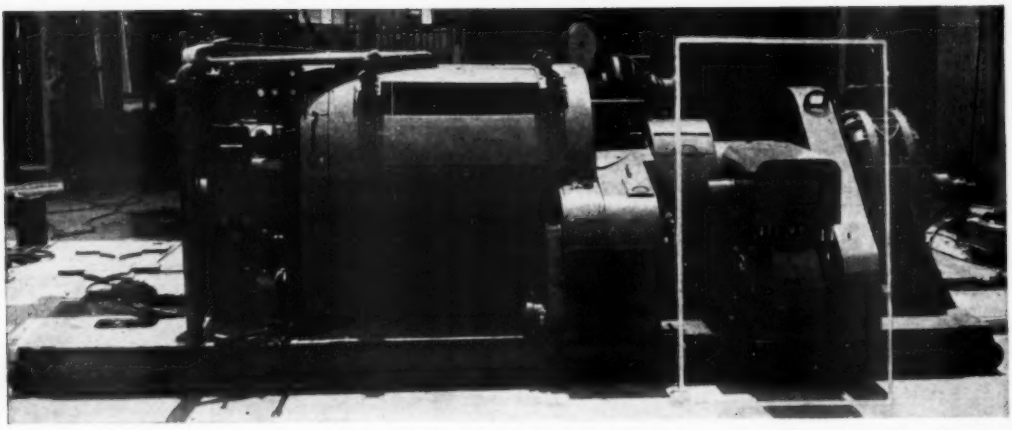


Fig. 1—Position of large control unit is just inside the auxiliary brake. Shown outlined here, the unit is fitted to the drum shaft at its outer end.

Here's a new

Automatic Drilling Control

Unit operates on principle of torque reduction from main drum shaft and has only three primary parts

by Roy F. Carlson
West Texas District Editor

AS wells are drilled deeper and deeper, and as more and more coring is done, accurate control of drilling weight becomes increasingly important to drilling efficiency. It is to provide this control and furnish this efficiency and obtain optimum penetration rates that automatic drilling controls have been developed.

One of the most recent controls marketed has been developed by Texas Flange Co., Odessa, Tex. This control operates on well-known principles of torque reduction from the main drum shaft; and a controlling pump or hydraulic motor, the output of which is governed by a valve controlled by a dead-line tension which is directly related to bit weight.

Actually three different controls are manufactured by Texas Flange Co., a large unit for mounting on big rigs, a scaled-down model for smaller draw works, and one designed especially for use with a U-15 Unitrig draw works. All these controls generally operate on the same principle.

Operating Principles

The control unit consists of three primary parts, an air-hydraulic system, another hydraulic system, and a speed-increaser or gear system. These systems are interconnected from dead line to draw works to provide the over-all control.

On the larger models a geared speed increaser, or conversely, torque reducer, is driven from the draw-works drum shaft through a large sprocket and chain transmission system, the sprocket being mounted on a drum-shaft extension. The gear train, in turn, drives a small rotary hydraulic motor or pump.

With unreeling of line from the drum shaft, the speed increaser revolves, and in turn rotates the hydraulic motor or pump—in this case the hydraulic unit acts as a pump. The pump circulates fluid through a diaphragm-type air-operated motor valve, and back to an oil-storage tank.

The air-operated motor valve regulates flow from the hydraulic pump-motor unit thereby controlling the rate of rotation of the gear train. This ultimately controls the rate of rotation of the drum and the rate of release of drilling line or the rate of lowering of the block and hook with attached drilling string. Therefore, if the valve is closed, the drum shaft and pump are prevented from turning.

Weight variations.—Degree of regulation of the hydraulic stream by the motor valve is accomplished by a pneumatic-hydraulic system connecting the dead line and the motor valve. The pressure side of the weight-indicator-type diaphragm is connected to the control side of a Wizard pressure regulator through a hydraulic system. Changes in bit weight and consequent variations in dead-line tension vary the hydraulic pressure on the control side of the regulator. These pressure changes in the regulator, through a bourdon tube-orifice-flapper valve arrangement vary pressure in a continually flowing stream of air by varying the amount of air permitted to escape from the system through the orifice.

Air-pressure variation is transmitted to the motor valve, changing the opening of this valve in direct relation to dead-line pull, which controls the amount of fluid flowing through the valve and the pump upstream of the valve. Rate of release of line from the draw-works drum is thus regulated. Increase in diaphragm pressure with decreased bit weight and increased dead-line pull, causes a decrease in motor-valve pressure and a partial opening of that valve. Therefore, as the bit drills off, pressure builds up in the dead-line diaphragm, which, through the air-hydraulic system, opens the motor valve, and permits the drum to pay out line increasing weight on bottom until an equilibrium point is reached. Lowering of the drill string is halted by a reversal of the pressure changes.

Light strings.—When drilling at shallow depths or coring, or when using tubing in a lightweight drilling string at reasonably shallow depths in the large drilling controls, there may be insufficient torque applied to the drum shaft to pay off line fast

DOWELL SPINNER SURVEY pin-pointed tight zone— Selective Acidizing did the rest

A newly deepened well was producing 8 bbls. of oil per day on pump. Dowell engineers ran a Spinner Survey and, on the basis of the permeability profile obtained, used the Electric Pilot to acidize *selectively* only the newly deepened section. The treatment increased production to 65 bbls. of oil per day, flowing.

Relative permeability profiles made with the Dowell Spinner are valuable in planning completion and workover programs. Spinner Surveys also are used to determine the relative production of different zones in a producing gas or oil well; to locate points of lost circulation, holes in pipe, leaks in casing seats and leaks in bottom hole plugs.

For more information about the Dowell Spinner and the other valuable Electric Pilot Services offered by Dowell, call the nearest Dowell Station.

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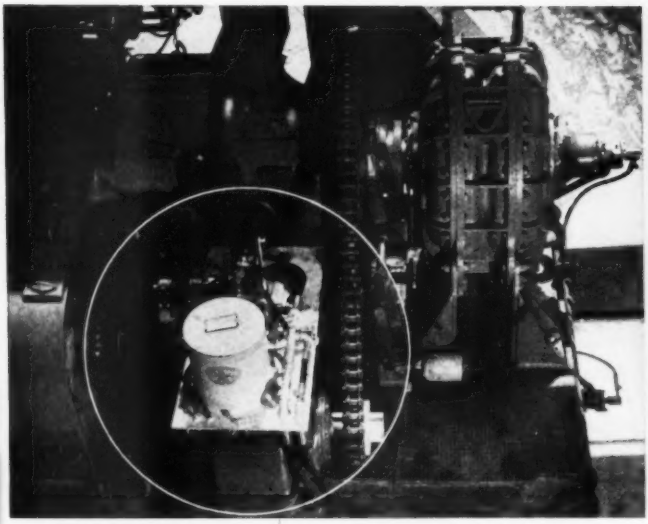


Fig. 2—A view of the control with covers removed. This is the same unit shown in Fig. 1.

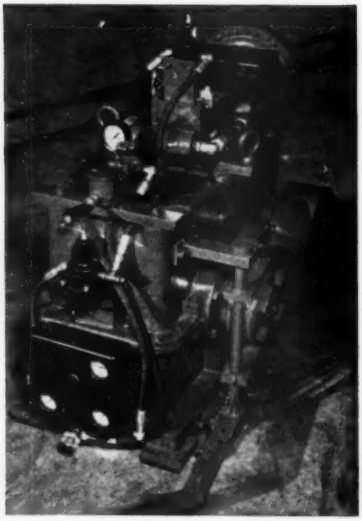


Fig. 3—One of the two smaller control units.

enough to drill at the desired speed. When this occurs a supercharge pump takes over and, causing the main hydraulic pump to turn as a motor, furnishes the power to turn the gear box and drum shaft paying off drilling line to maintain the desired drilling rate. A check valve, installed on the suction from the supply oil tank, automatically opens and closes depending on the system's demand for oil. No change or adjustment is necessary when weight of the drill pipe becomes sufficient to cause the control function without the supercharge pump. This pump is normally operated from the rotary countershaft through a V-belt drive.

Orifices in the pneumatic system and regulation equipment in the hydraulic system are sized so the control will pay out enough line with eight lines strung to drill at any rate from 0 to 75 ft. per hour. The maximum recommended drill-pipe load is 240,000 lb.

Small draw works.—The drilling control for the U-15 draw works incorporates some features not included in the larger control, and eliminates others. Because the control and the draw works to which it is fitted are both smaller, it is far more sensitive to changes in bit weight, and consequently the booster pump has been eliminated. Also on this control the chain drive found on larger units has been eliminated. Instead, drive is through a jaw clutch to the high-speed auxiliary brake shaft incorporated in this particular unit.

In the smaller control the same air-hydraulic system is used with the addition of an air relay making the system react faster than the larger models. This relay consists of a sensitive diaphragm which is subjected to the pressure variation of the Wizard regulator. This diaphragm in turn controls the air pressure operating the motor valve. This control is completely shop assembled, requiring a minimum of time for attachment to the draw works. It can be easily attached in the field.

Simple installation.—To make the drilling control easy to install on the draw works without machining a new shaft, Texas Flange Co. has devised a shaft extension, clutch, and drive-sprocket assembly which can be installed on the draw works in a minimum of time. The shaft extension is bored internally to fit the standard auxiliary brake-shaft taper where the auxiliary brake-jaw clutch is normally located. On its outer end the extension has a machined duplicate of that shaft end and taper. The extension provides space in which to locate a clutch for engaging and disengaging the drive sprocket and shaft extension, and includes a bearing through which the shaft turns the auxiliary brake when the drilling control is disengaged.

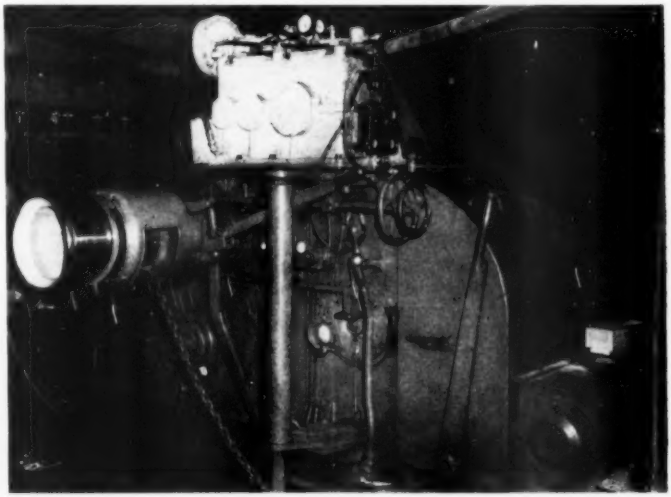
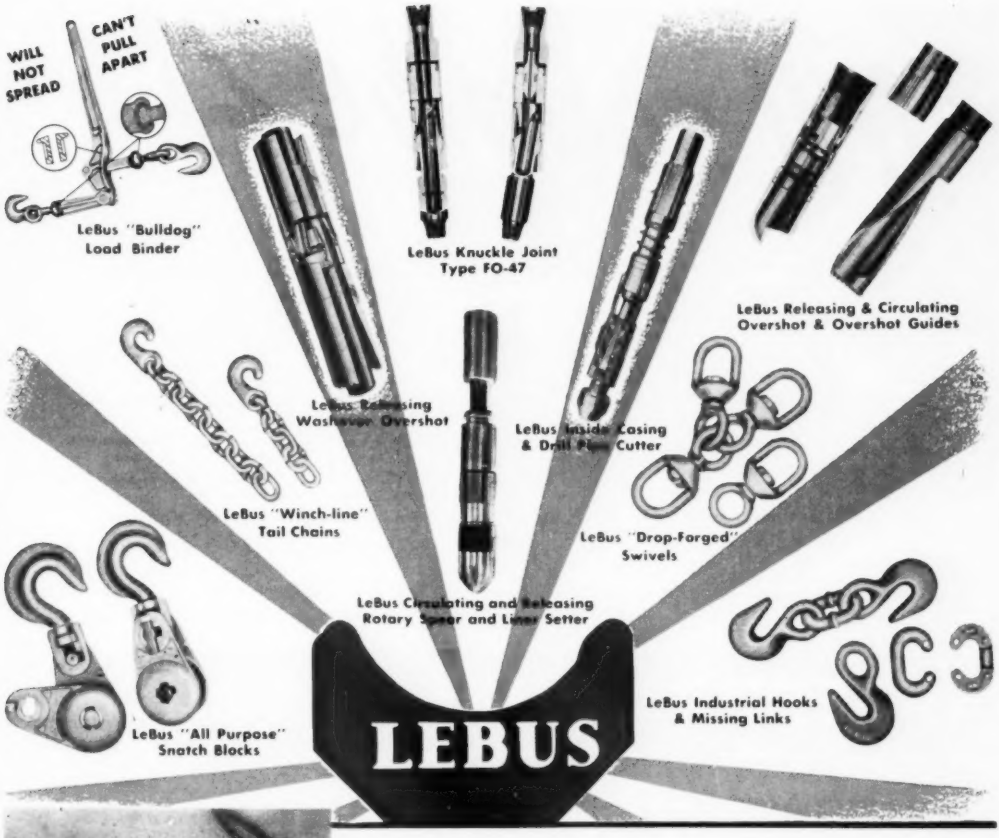


Fig. 4—The control shown here is installed on a rig drilling in the field. The Wizard controller, on front of the unit, is located at driller's-eye height.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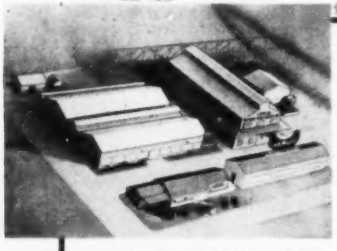

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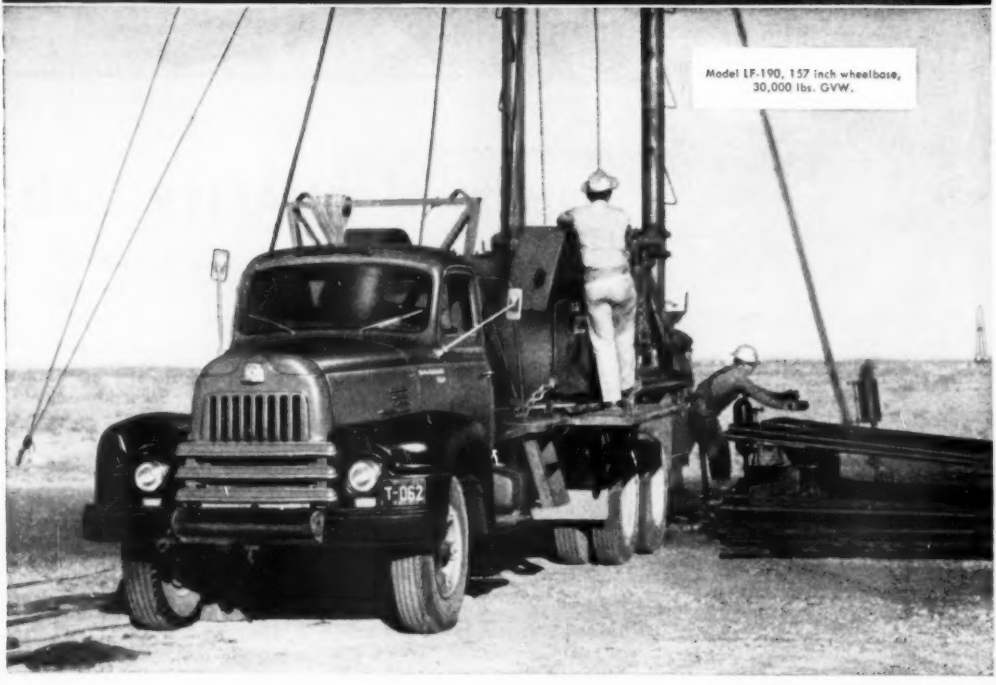


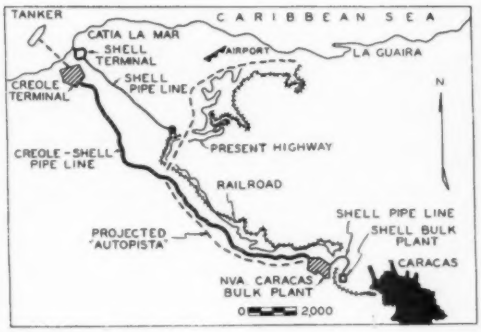


Fig. 1—Route to Tacagua products line.

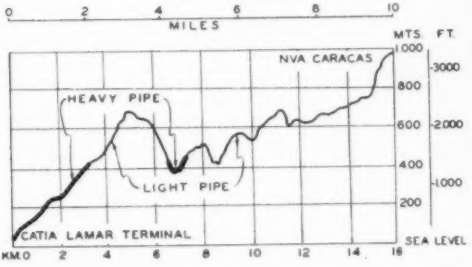
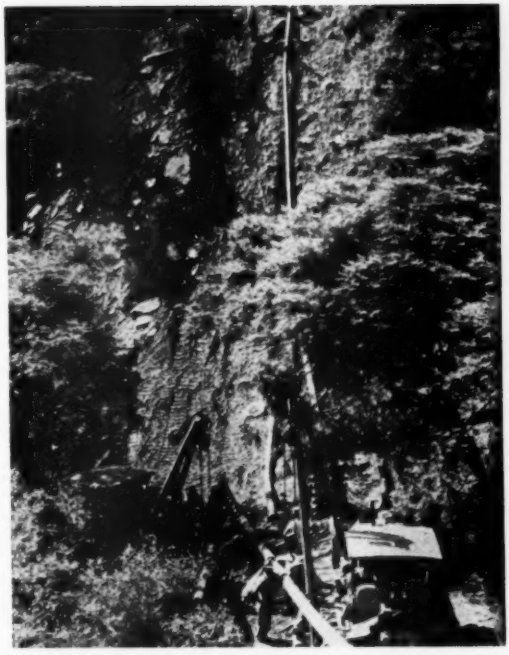


Fig. 2—For sections of higher pressure on the 8⅝-in. o.d. Tacagua line, heavy pipe (0.400-in. thickness, 35.14 lb. per foot) was used.



The rugged terrain made installation of the Tacagua line extremely difficult. Only a half mile of the line is on level ground.

Design Features of "Steepest Inch" Pipe Line*

Although only 10 miles long, this new products line is one of world's steepest. Grades reach a maximum of 45 per cent

THE Tacagua products line, placed in operation in November 1950 between Caracas and the marine terminal of Catia de la Mar, is unusual in that it is the steepest oil pipe line in operation in the world. Along its total length of 10 miles through mountainous terrain, the line rises from 64 ft. above sea level at Catia la Mar, ascending about 2,300 ft., then descends about 1,000 ft. into the Tacagua Valley, finally climbing up to a maximum height of 3,100 ft. The rugged terrain made installation of the line difficult in spots, since grades as high as 45 per cent had to be surmounted. (*The Oil and Gas Journal, April 5, 1951, p. 99.*) Only about half a mile of the line is entirely straight; the remainder does not have even two joints without some slight bend.

Products to Caracas.—The daily requirements of Caracas' pulsing industrial life have now reached 8,200 bbl. (gasoline, kerosine, diesel, and gas oil), while a conservative estimate of future daily requirements for the year 1955 is 20,000 bbl. From eastern and western Venezuela the products arrive by tankers at the terminals of each company (Creole and Shell) at Catia la Mar. The transportation of these products to Caracas had in the past required the use of a large fleet of tank trucks along the steep, winding road, with some additional relief from an existing pipe line built by the Shell company between Catia la Mar and Boqueron, a point halfway up where the products were moved by rail to Caracas. The capacity of this "rail line" was 2,050 bbl. per day or one-fourth of the present requirements, or one-tenth of the future estimated requirements for the year 1955. In addition the cost of transportation by these combined means was very high. For these reasons, construction of the "Steep-Inch" line was initiated by Creole Petroleum Corp. and Shell Caribbean Petroleum Co., Ltd. The map, Fig. 1, shows the route of the Tacagua line.

Station equipment.—The following equipment was installed at Catia la Mar pump station: (1) Two booster pumps to insure a positive suction head on the main-line pumps. These are Bingham 4-stage, 1,200-r.p.m., 1,500-bbl. per hour on gasoline (specific gravity 0.71) at 30.7 psi. They are powered by 27-hp., 208-volt, 60-cycle electric motors. One pump is a standby. (2) Three high-pressure main-line centrifugal pumps. Bingham 6-stage, 1,500-bbl. per hour, 2,010-ft. head, 80 per cent efficiency, 3,550 r.p.m., 470-hp., on gasoline 0.71 specific gravity. Two pumps in series are required in order to raise the load to 4,000 ft. The third pump is a standby. These pumps are powered by Cooper-Bessemer diesel engines, type JS-6, 13 by 16-in., 450-r.p.m., 580-bbl. per hour, 4-cycle. The accessories were also supplied by Cooper-Bessemer, including cooling water and air starting equipment. Speed increasers are Westinghouse type SU-24-12 rated for continued service at 545 bbl. per hour (8:1 gear ratio). (3) Two Westinghouse 500-kva., 3-phase, 480-volt, 60-cycle generators driven by Cooper-Bessemer JS-6 diesel engines to supply the required electric power for

*Paper contributed by Creole Petroleum Corp.

lighting, control and auxiliary equipment. One of the generating units is a standby.

Pipe line.—This is 10 miles of 8⅝-in. o.d. seamless-steel line pipe, Grade B. As shown on Fig. 2, two thicknesses were used, the heavier of 0.400-in. thickness (35.14 lb. per foot) for the sections of higher pressure; the standard of 0.322-in. thickness (28.55 lb. per foot) for the sections of lower pressure.

Engineering design.—The fact that there is only one pump station, when the topography of the federal district is considered, may be of interest. The difference in elevation between Catia la Mar and Nueva Caracas is approximately 3,120 ft., which corresponds to a pressure of 960 psi. when the fluid considered is gasoline, 1,130 psi. for diesel oil, etc. The possibility exists of reaching pressures as high as 1,790 psi. during actual operation of the pipe line. The forces on the pipe line were not of such great importance as the problem of maintaining high efficiency at low operating cost with a load of more than 3,940 ft. on the pumps. The advantages of centrifugal pumps in the pumping of light products are irrefutable: low cost compared with piston pumps, safe shut-off head, absence of pulsations and vibrations.

The problem of excessive pressures on the packing was solved by means of a bleedoff of 1¾ per cent of the delivered volume to the station suction. The corresponding loss of 1¾ per cent represents a moderate price for this relief from high pressures which otherwise would have made the maintenance of the packing difficult.

The decision to combine the two stages of pumping in a single station in Catia la Mar represents an appreciable saving as it is evident that a second station along the line would have required duplication of structures, access roads, electrical installations, and controls in addition to more personnel.

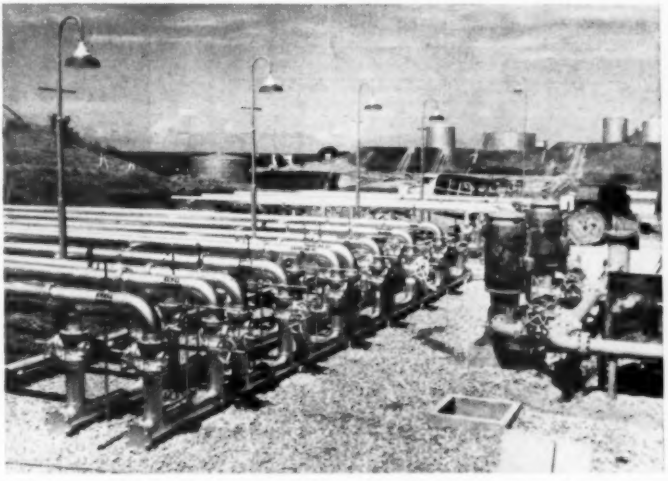
Safety considerations. — The pumping of fuels makes imperative the greatest of care in the evaluation of the high pressures that might occur in the pipe line and in the testing of the pipe line under conditions even more severe in order to insure, as far as modern technology can, the complete elimination of the chance of rupturing the line. The following observations are pertinent: (1) The static pressure is proportional to the difference of elevation and the density of the fluid. The heaviest is gas oil with a gravity of approximately 0.85 and a pressure of 1,145 psi. at Catia la Mar. (2) The speed control of the diesel engines will maintain 1,240 psi. on the discharge side of the pumps, pressure that corresponds to 1,500 bbl. per hour of gasoline, and correspondingly lower quantities of the heavier and more viscous products. (3) A Mercoid switch will stop the pumps when the discharge pressures reach 1,550 psi.

Assume now that the controls do not function (regulators fail) and that a gate valve on the line is closed. When the flow is reduced in a centrifugal pump, the required energy for a certain velocity is also reduced and therefore the velocity of the engines tends to increase; fixing this increase at 5 per cent, the pressure of the pumps against a closed valve would rise to 5,840 ft. or 1,790 psi. In this case reference is made to gasoline with a specific gravity of 0.71, taking into account that the speed and head in feet on this column would be the same in the case of heavier products. The pressure of 1,790 psi. would apply closely to the other fluids also. The closing of this valve in the pipe line would bring about an increase in pressure caused by deceleration of the fluid converting kinematic energy into another form, such as pressure (potential) or mechanical work (expansion of the pipe line and compression of the fluid) and as a last step in these two cases into heat.

It is well to note that the equations applicable to masses of theoretically inelastic fluid, though they be of great utility in the design of short lines, are not valid in the case of large-diameter long pipe lines that are utilized now for the transportation of fluids. The concept of the elasticity of fluids and of the pipe line acquires importance. As a result of numerous studies and experiments made by companies interested in the transportation of petroleum and its derivatives, data have been obtained which permit taking into account this elasticity when the wall thickness and diameter of the pipe and the compressibility of the fluid are known ("bulk modulus"). In other words, this is not the "shock" of an inelastic mass but of a wave of metallic expansion and hydraulic compression (pressure) which originates at the point of closure and is propagated throughout the length of the pipe with a velocity that depends on the previously mentioned characteristics of the fluid and of the pipe. An excellent resume of recent studies of this type may be found in "Pressure Surge Tests," by John E. Green, of Shell Pipe Line Corp. *(The Oil and*

(Continued on page 115)

Tanker unloading products at Catia La Mar where the Tacagua line starts up the Avila Mountain towards Caracas.



Intake manifold at Catia La Mar pump station. Gasoline, kerosine, diesel and gas oil are handled daily by these lines.

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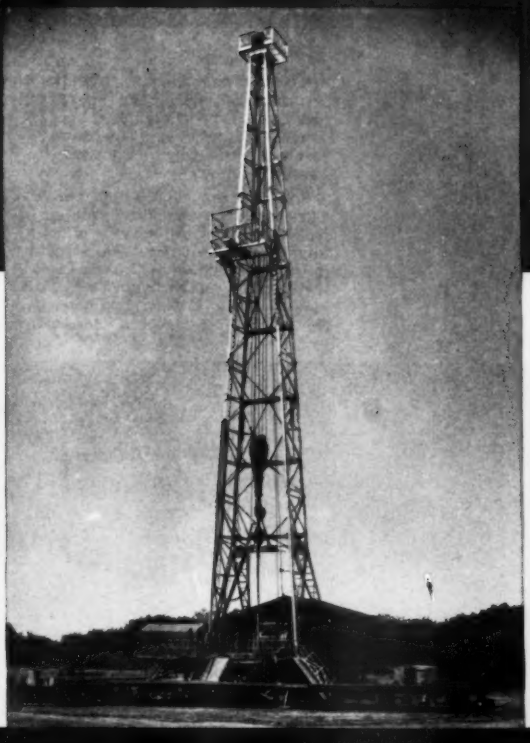

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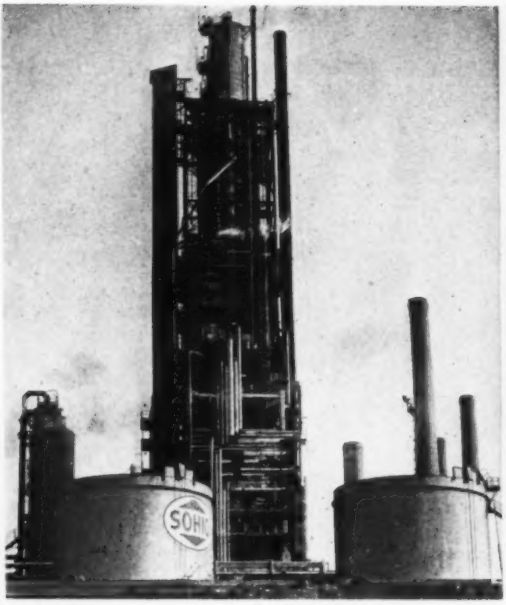
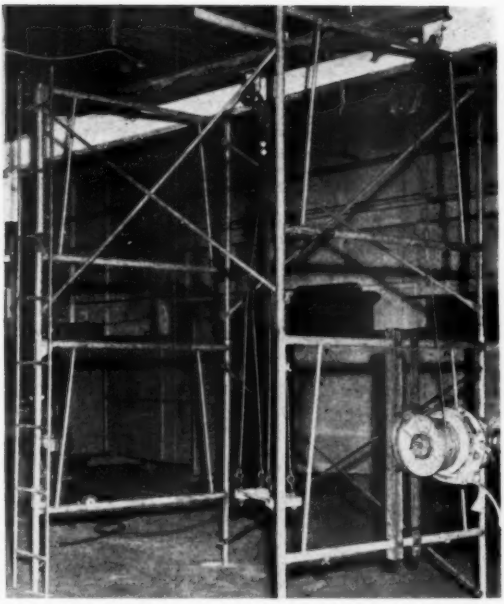


CAT CRACKER.—Catalyst lift pipe on T.C.C. unit, at Sohio's No. 1 Cleveland refinery, extends from lift pot at grade level to inside separator surge tank at top of unit.



PORTABLE SCAFFOLD.—This was designed to fit through the 20-in. diameter manhole in separator surge tank at top of T.C.C. unit. Note wingnuts on scaffold members used in assembly.

How Sohio made first complete

Internal Inspection of 240-Ft. T.C.C. Cat Lift Line

by Charles I. Ball*

TO make a detailed examination of 240 ft. of catalyst lift pipe, Standard Oil Co. of Ohio inspection personnel had to go up and down the inside of the pipe suspended in a "bosun's" chair.

Sohio's twin 18,000-bbl. per day Thermofor cat cracking unit, at its No. 1 Cleveland refinery, is a 268-ft.-high unit (tallest industrial structure in Ohio), which went on stream early in 1950. The catalyst pipe itself tapers

*Chief inspection engineer, No. 1 refinery, Standard Oil Co. (Ohio), Cleveland.

GOING DOWN.—C. I. Ball, chief inspection engineer, on bosun's chair in 240-ft.-long lift pipe.

INSIDE DIAMETER.—T. E. Burden, Sohio metal inspector, is making measurement inside lift pipe.

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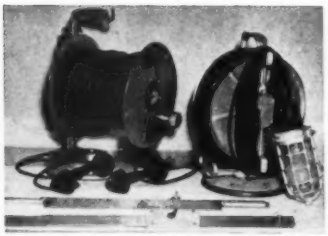

***SPECIAL EQUIPMENT.**—Sound-powered telephone and electric light, each with 350 ft. of cord, and internal calipers used in the inspection.*

from 24-in. diameter and ¾-in. wall thickness at the bottom to 39-in. diameter and ⅝-in. wall thickness at the top. This pipe runs through the center of the kiln, which was built around it.

Inspection problem.—An Audigage had been successfully employed in obtaining metal thicknesses on certain sections of the lift pipe. The use of this instrument was somewhat limited because the outside surface of the pipe was not accessible over most of its length. Elaborate scaffolding and a major insulation job would have been necessary to make most of the length of the pipe available for taking Audigage thickness measurements. Furthermore, a portion of the pipe was not externally available because it ran through the center of the kiln. In addition, the erratic nature of the erosion, such as excessive grooving of sections of the longitudinal welds, made internal inspection necessary.

Bosun's chair.—For the initial trip down the pipe an I-beam frame was erected at its top to support a bosun's chair, operated by a one-half ton air hoist or "chugger" with a ¼-in. cable. The inspection procedure was devised by the author and members of the inspection division of the refinery-engineering department in cooperation with the repair and maintenance department.

Auxiliary equipment.—An electric light was fastened to the top of the bosun's chair. This supplied adequate illumination for taking measurements and for allowing a close visual inspection. For communication between the inspector in the chair and the hoist operator and for transmitting inspection notes, a sound-powered telephone was used with great success. Goggles and a respirator were also found necessary as a protection against catalyst dust because of the draft caused by stack effect.

Internal calipers.—Two gages were designed by the refinery machine shop for taking measurements of the internal diameter. One consisted of 24-in. and 18-in. sliding steel scales 1¼-in. wide by $\frac{1}{16}$-in. thick, retained by an aluminum holder with a thumb screw to adjust the sliding pressure. The other gage was a 24-in. slotted section of ¾-in. o.d. exchanger tube with a steel scale fastened on the outside and containing a sliding bar with a pointer. Both instruments proved to be practical.

Improvements.—Experience gained after the inspection of the first unit, which took over 3 hours, showed the desirability of a number of improvements in the method of inspection. For handling the long lengths of electric light and telephone cords necessary, the refinery electrical department altered standard Port-O-Reels to install 350-ft. lengths of cord on individual reels.

A portable scaffold in sections small enough to pass through the 20-in. manhole in the surge drum at the top of the pipe was large enough to allow complete access to the upper section of the drum for maintenance work. This scaffold also provided a permanent mounting for the bosun's chair and air hoist. For making repairs a special tubular cage was designed, which provided a satisfactory and safe working platform at any elevation inside the pipe.

These improvements materially reduced the inspection time. Even so, a trip up or down the 240-ft. pipe took a full 20 minutes without any stops for inspection. Sohio's No. 1 refinery was the first to make a complete internal inspection of a T.C.C. catalyst lift pipe following a period of operation.

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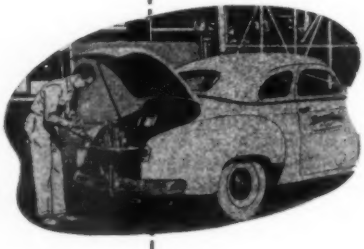

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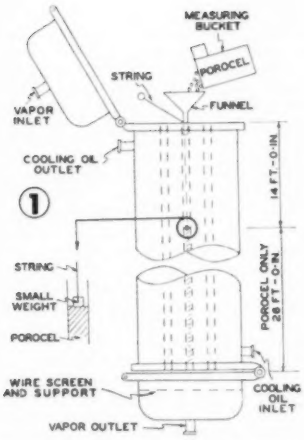


Fig. 1—First step, initial Porocel charge.

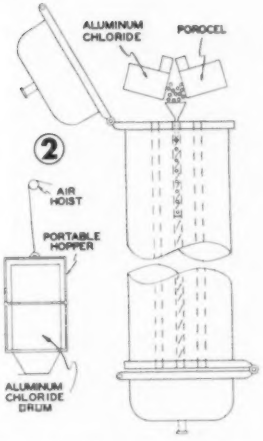
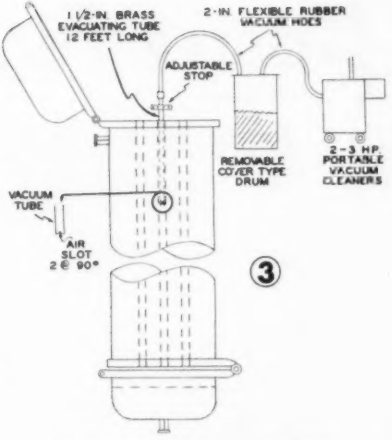


Fig. 2—Second step, adding 50-50 mixture.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REMOVABLE COVER TYPE DRUM
2-3 HP PORTABLE VACUUM CLEANERS
VACUUM TUBE
AIR SLOT 2 @ 90°
3

Fig. 3—Third step, preparing for booster.

Vapor-Phase Butane Isomerizer Operation . . .

a new procedure

by C. L. Persyn, Jr.*

THE Shell-type vapor-phase isomerization unit at the Avon, Calif., refinery of Tide Water Associated Oil Co. uses a solid catalyst of aluminum chloride and alumina with a promoter of anhydrous hydrogen chloride. The catalyst is contained in tubes surrounded by oil for temperature-control purposes.

For several years the isomerization catalyst used was a commercially prepared material consisting of about 18 per cent aluminum chloride impregnated on a Porocel carrier. This material was charged into the reactor tubes as received. The economical operating life was generally 4 to 6 weeks. At the end of this time the reactors were cleaned, often with difficulty due to caking of the catalyst in the tubes, and then the reactor was refilled with catalyst for another run.

After some experimentation, a reactor charging technique has been developed at Avon, which offers a number of advantages such as longer catalyst life, greater on stream time of the unit, and increased plant throughput.

The charging technique developed at Avon specified that the reactor is first filled with an "original charge" consisting of plain Porocel in the bottom two-thirds of the tubes, then the top third filled with a Porocel-aluminum chloride mixture.

When this original charge is spent, the top third is removed and a "booster charge" of aluminum chloride and Porocel added. From three to six booster charges can be used before it is necessary to completely clean the reactor and put in a new original charge.

Reactors are of the heat-exchanger type with top-and-bottom-hinged, removable heads. The bottom head contains a support with screen to retain the catalyst in the tubes. Each reactor has 220 tubes of 2-in. Schedule 40 pipe which are 40 ft. long.

Temperature of the cooling medium is controlled to maintain the desired reaction temperature. Controlled amounts of hydrocarbon and anhydrous HCl vapors enter the top of the reactor, pass through the 2-in. catalyst-filled reactor tubes where approximately 40 to 45 per cent of the normal butane is isomerized to isobutane, and out the bottoms of the reactors to guard chambers. Pressure in the reactors is regulated by a back-pressure control valve in the line of the total reactor effluent leaving the guard chambers.

*Superintendent of isomerization and alkylation units, Tide Water Associated Oil Co., San Francisco.

REFINING POINTERS

Original Charge

After the reactor has been cleaned, water washed, dried, and the bottom cover bolted tight following installation of a new support screen and gasket, it is ready for service. However, the top cover of the reactor is kept open. Cooling oil at a temperature of about 200° F. is circulated through the reactor shell to insure maximum dryness and to warm the added Porocel to near the desired reactor operating temperature.

Porocel, as received from the manufacturer in removable-cover-type drums, is scooped into a measuring bucket and poured slowly into a funnel which is inserted into one of the tubes as indicated in Fig. 1. From experience it is known about how

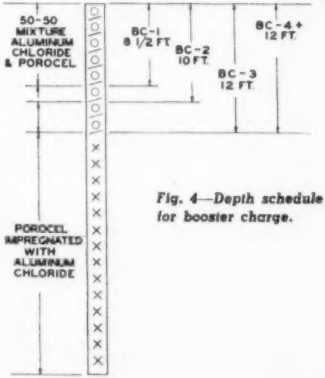
50-50 MIXTURE ALUMINUM CHLORIDE & POROCEL
BC-1 8 1/2 FT.
BC-2 10 FT.
BC-3 12 FT.
BC-4+ 12 FT.
POROCEL IMPREGNATED WITH ALUMINUM CHLORIDE

Fig. 4—Depth schedule for booster charge.

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much Porocel is needed to fill the reactor to the 26-ft. level. By moving a weighted string up and down through a short distance, the 26-ft. Porocel level can be located within plus or minus 1 ft. Four to six tubes are calibrated in this manner to obtain the measured quantity of Porocel to fill one tube to the 26-ft. level. After the initial calibration, a check depth should be made after 25, 50, 75, 100, and 150 tubes are filled to confirm the calibration or reestablish a new calibration.

Once the initial calibration is obtained, two sets of filling equipment should be used. This operation is continued until all tubes have been filled to the 26-ft. level.

Aluminum chloride is handled in a portable hopper. Equal volumes of Porocel and aluminum chloride are put into separate measuring buckets as shown in Fig. 2. The bucket of aluminum chloride and the bucket of Porocel are poured simultaneously into the funnel, putting a 50-50 mixture of the two materials in the upper 14 ft. of the tubes, on top of the 26-ft. level of Porocel. After the reactor has been filled, new gaskets are installed and the top cover bolted down.

Preparing for Booster Charge

When the original charge or a booster charge has reached the end of its economic run, the reactor must be prepared to receive a new booster charge. To accomplish this all HCl recycle to reactor must first be shut off. Then the butane charge rate to reactor is lowered to about two-thirds normal rate and system pressure is reduced sufficiently to eliminate possibility of butane condensing in reactor catalyst. Butane rate is continued for 4 to 6 hours. Next the reactor is shut in and depressured to atmospheric pressure and then blinded. Then the outlet pipe is removed for inspection of cleanliness; if clean, it is reinstalled; if dirty, it is left off for cleaning but the reactor's bottom nozzle blind flanged. Inlet piping is then removed and a blind flange installed on its inlet nozzle. The reactor is now ready for maintenance crews.

The spent 50-50 mixture of aluminum chloride and Porocel is removed by vacuum. Fig. 3 shows the equipment arrangement for removal of spent charge from the reactor. Fig. 4 shows the depth to which the brass vacuum tube should be inserted into each reactor tube. After all tubes have been vacuumed out to the depth given in Fig. 4, the reactor is ready for receiving the booster charge.

The first 50-50 mixture of aluminum chloride and Porocel to be charged to the reactor after the original reactor charge is designated BC - 1. Subsequent 50 - 50 mixture batches of aluminum chloride and Porocel to be charged to the same reactor for other booster charges are designated BC-2, BC-3, etc. (Fig. 4).

After the reactor has been prepared

to receive a booster charge, a drum of aluminum chloride is placed in a portable hopper which is raised to a convenient height by an air hoist (see Fig. 2). Equal volumes of the granular aluminum chloride and Porocel are put into separate measuring buckets and their contents simultaneously poured into the funnel as described previously. All tubes are filled to their top. Two sets of measuring buckets and funnels increase speed of the operation. When the reactor is filled, a new gasket is installed and top cover bolted down.

The procedure to be followed when putting a reactor into service is the same whether a reactor has received an original charge or a booster charge.

After reinstalling inlet and outlet reactor piping, cooling oil is circulated at the desired operating temperature for about 2 hours before any hydrocarbons are put through the reactor. Next reactor inlet and outlet blinds are pulled and then air is purged from the system with butane vapor feed.

In the next step circulating-oil temperature is raised 15° to 20° F. above the normal starting temperature, then reactor inlet and outlet valves are opened. Butane only is run to reactor at two-thirds normal rate for period of 24 hours.

At the end of the initial subliming period, system pressure is then lowered sufficiently to prevent butane condensing in reactor when circulating-oil temperature is reduced to normal. After lowering circulating-oil temperature to reactor to 205° F, HCl is added and regular standard operating procedure is followed. Conversion will increase about 10 per cent each day until a 40 to 50 per cent point is reached.

Cleaning Dead Reactor

For this operation shut off the HCl recycle to the reactor. Then lower the butane charge to two-thirds normal rate and reduce system pressure sufficiently to eliminate possibility of butane condensing in reactor catalyst. Continue at this rate for 4 to 6 hours then shut in reactor and depressure to atmospheric pressure. Blind the reactor system.

Place dump truck or carryall box under reactor, remove piping, and open top and bottom covers. Rap bottom reactor flange with heavy hammer to drop out all possible catalyst. Use the vacuum method for removing the top 12 ft. of the catalyst bed when necessary. Catalyst still remaining in the tubes must be removed by a diamond drill from the bottom. Should the diamond drill become stuck in a tube, it can be removed with a stream of water.

When all catalyst has been removed, wash each tube with water. Dry the reactor, install new support screen in bottom head, and bolt up bottom cover using new gasket. The reactor is now ready to receive an original charge.

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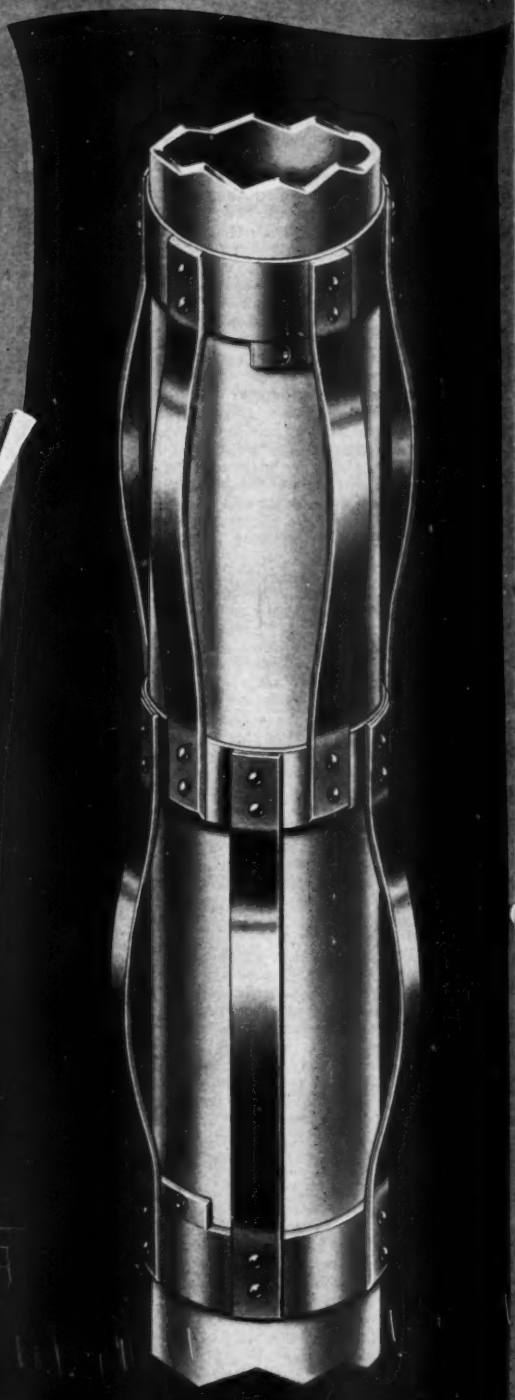

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Union Oil's New Plant

(Continued from page 97)

asphalt bottoms stream. The rate of solvent injection is regulated by manual control valves; the volume added is obtained directly from a displacement meter.

When blends are made from stocks in storage, the proper asphalt and solvent are pumped into a run-down tank in the approximate blend proportions so that mixing is obtained in the rundown line. In this blending, gear pumps are used. Since delivery of these pumps is at almost constant rate, thus establishing the asphalt rate, the desired blend is obtained through metering in the correct volume of solvent.

The displacement meters used are equipped with air operated shutoff valves to close off solvent flow and microswitch controls to shut off the solvent pumps. In blending cutback asphalts and road oils, the quantity of solvent required for the blend is set off on the counter of the meter. When this predetermined quantity is delivered the automatic controls close the shutoff valve on the solvent line and stop the pump.

Steam facilities.—Steam for powering pumps, heating exchangers, and utility steam is supplied by a packaged-type 150-psi. plant. The boiler and its accessories constitute a complete steam plant, including deaerating preheater and water-treatment facilities, and has a capacity of 20,000 lb. per hour of 150-psi. steam. The boiler, like the crude heater, is fired with industrial fuel oil.

Stripping steam and that from the feed-water deaerating preheater is supplied by a 20-psi. exhaust steam system. If the reciprocating and steam-turbine driven pumps do not supply sufficient low-pressure steam, a pressure controller on the 150-psi. system automatically bleeds steam into the 20-psi. system.

Design Features of "Steepest Inch" Pipe Line

(Continued from page 104)

Gas Journal, Vol. 48, No. 32, Dec. 15, 1949). In accordance with the data presented by Green it is possible to adopt the following equation:

$$P_s = \frac{waV}{144g}$$

where:

P_s = surge pressure
w = weight of liquid per cu. ft. lb.
V = velocity change, ft. per second
g = 32.2 ft. per second
a = wave velocity, ft. per second

$$a = 12\sqrt{\frac{g}{w}}\left[\frac{1}{1/K + D/tE}\right]^{1/2}$$

where:

a = wave velocity, ft. per second
g = acceleration of gravity, 32.2 ft. per second
w = weight of the flowing liquid, lb. per cu. ft.
K = bulk modulus of the liquid, psi.
D = diameter of pipe, in.
t = pipe-wall thickness, in.
w = Young's modulus of the pipe material, psi.

Applying these equations to our pipe line for the deceleration of the maximum capacity (gasoline) of 1,500 bbl. per hour and assuming that the valve is closed in 5 seconds, one has:

$$a = 12\frac{32.2}{44.3} \times \left[\frac{1}{(1/145{,}000) + (8/0.4 \times 30 \times 10^6)}\right]^{1/2}$$

$$= 12 \times 0.728 \times \left(\frac{10^6}{7.57}\right)^{1/2}$$

$$= 3{,}170 \text{ ft./sec.}$$

and therefore:

$$P_s = \frac{44.3 \times 3{,}170 \times 7.3}{144 \times 32.2 \times 5}$$

$$= 44 \text{ lb./in.}^2$$

For calculation with these equations, assuming the valve is closed in 5 seconds, an approximation of the thickness of the pipe line (see Fig. 2) is used.

Even though a complete closing of the valve in less than 5 seconds may be considered impossible in this case, we have used a valve of P = 50 V in

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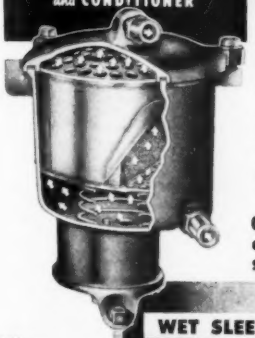

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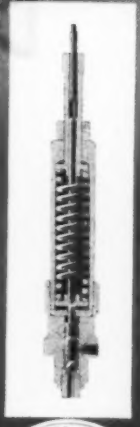
Type A Otis Surface Safety Valve is for flow wings, gathering lines, etc., where a full-opening valve is not required. These self-contained, fully-automatic safety devices are more efficient and more dependable than personal supervision of high-pressure oil and gas wells, and afford 24-hour protection against fire hazards, waste of oil and gas, or damage to nearby property. They instantly shut in the well in case of a line break, freeze-up, or other emergency condition which might cause an increase or decrease in pressure beyond safe or practical limits. The model installed on the tree (above) is the Type A with a special pilot fixture for an injection line which activates the safety valve by pressure variations at a point downstream of the surface choke.



holding in high-pressure pilot holds ball valve closed against thrust of pressure in safety valve chamber. Used to pressure forces the ball from seat, releasing pressure to atmosphere, closing valve. Low-pressure pilot operates similarly upon drop in pressure in safety valve chamber.

Type X Otis Surface Safety Valve consists of bonnet assembly of high- and low-pressure pilots and packing assembly around stem of full-opening gate valve. Auxiliary pilot assembly for external-pressure operation through line from tubing choke can be installed on this valve also.

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the design of the pipe line in general which is equal to 365 psi. and is equivalent to a complete closing in 0.7 seconds.

Assuming a shutoff of the pipe line in 0.7 seconds, a hypothetical condition is obtained in which the wave of 365 psi. will arrive at Catia la Mar, where there already exists a maximum static pressure due to the profile of the line.

If a start is made with the 1,240 psi. corresponding to the maximum flow of gasoline and assuming, as mentioned before, that the pressure regulators are not functioning, it may be concluded that this wave would have the principal effect of accelerating the change in the velocity factors within the pumps that lead to a condition of no flow; that is to say, the wave would constitute a hydraulic shutoff. It is important to remember that the centrifugal pump produces energy in the form of pressure by the conversion of the kinematic energy of the fluid as it leaves the impellers and decelerates. As a result the pump is a type of hydraulic spring. The increase in pressure of 1,240 psi. due to the "pressure surge" assumes a minor importance on being compared to the increase of 550 psi. (from 1,240 to 1,790 psi.) which is the result of a complete shutoff.

For this reason it has been concluded that the highest pressure that should be anticipated (considering the characteristics of the profile, fluid, pumps, pipe line, and moving power, and assuming the failure of the pressure regulator) is 1,790 psi.

In order to provide a margin of safety, the test pressure has been fixed at 2,000 psi. for the lowest elevation at Catia la Mar, reducing this pressure in accordance with the profile until the minimum pressure of 625 psi. is reached at Nueva Caracas, the highest elevation. The test pressure of 2,000 psi. will produce a stress of approximately 21,300 psi. on the pipe line, or, in other words, 54 per cent of the elastic limit of 40,000 psi.

Flow interruption.—Having foreseen the possible failure of the regulars insofar as the pressures on the pipe line are concerned, one can now study the effect an interruption in flow will have on the pumps. In the case of a complete shutoff 100 per cent of the kinematic energy in the pump will be converted into heat energy, which will bring as a consequence a rapid increase in the temperature of the fluid. The resulting expansion of the rings, bearings, and parts of the pump casing will soon produce disastrous consequences in a high-pressure centrifugal pump. Considering this possibility, the flow recorder in the station is provided with an alarm to operate in the case of no flow. In addition each pump is equipped with a Mercoid switch which is actuated by a thermal element mounted on the pump in contact with the fluid to stop the pump if the temperature rises to 150° F.

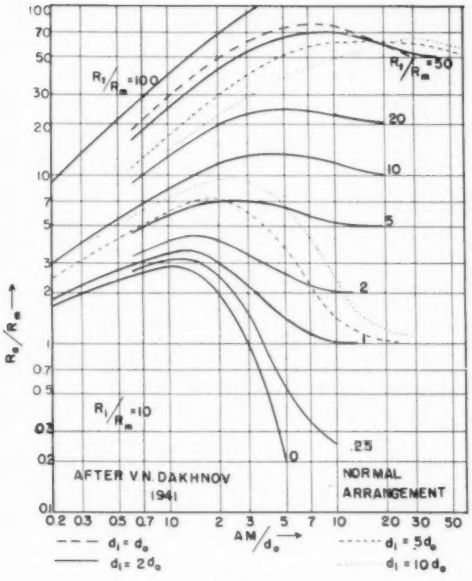


Fig. 1.

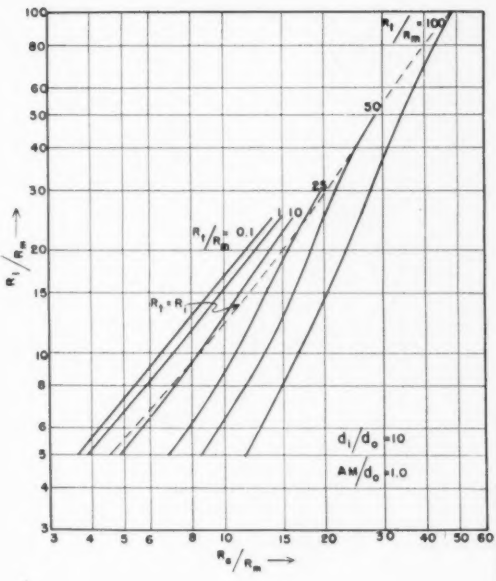


Fig. 2.

SIMPLIFIED DEPARTURE CURVES

. . . and the effects of the equivalence principle in resistivity logging

by Dr. Leendert de Witte*

Abstract

This article discusses the use of "simplified departure curves" in which apparent resistivities are plotted versus invaded zone resistivities and true resistivities for fixed values of the ratio of spacing over hole diameter.

The simplified departure curves may be plotted such that we can obtain a direct graphical solution of invaded zone and true resistivity for every assumed invasion diameter using two measured apparent resistivities. This results in an infinite series of possible solutions. It is shown that no number of additional normal curves within the limits of conventional spacings is capable of resolving which of the possible combinations is present in the formation under investigation. The possible solutions are therefore termed "equivalent combinations" of true resistivity, invaded zone resistivity, and invasion diameters. They are manifestations of the equivalence principle in conventional resistivity logging.

For very long normal and lateral spacings the apparent resistivity approaches true resistivity as we increase the spacing. The closer the curves approximate true resistivity, the better they will differentiate between the equivalent combinations. The usefulness of the very long spacings is seriously limited, however, by bed thickness effects and boundary phenomena.

It is shown that the Laterolog and the induction are capable in some particular cases to resolve between the equivalent combinations and give a unique solution for the unknown parameters. A great need remains for a logging method that will give a universal solution to the equivalence problem.

Introduction

IN electric logging, the conventional resistivity curves are measurements of potentials or potential differences in the bore hole, which arise due to the presence of one or more current electrodes located approximately on the axis of the hole.

In a homogeneous medium the potentials at a given distance of a current electrode are a function only of the magnitude of the current, the distance from the current electrode, and the resistivity of the medium. The actual relation between these quantities is:

$$V_s = \frac{IR}{4\pi s}$$

where

V_s = potential at distance s from the current electrode
I = total current through the electrode
R = resistivity of the medium

*Research engineer, production research division, Continental Oil Co., Ponca City, Okla.

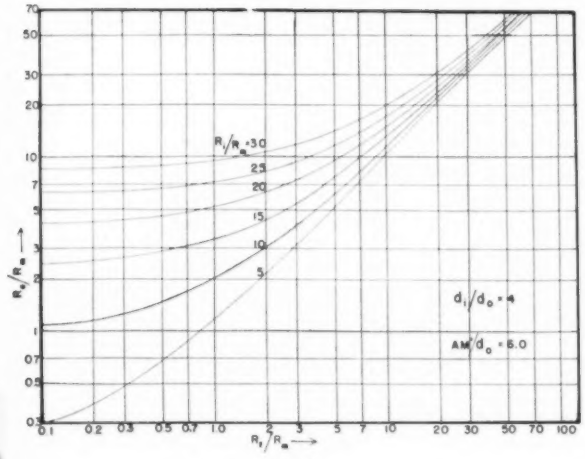


Fig 3.

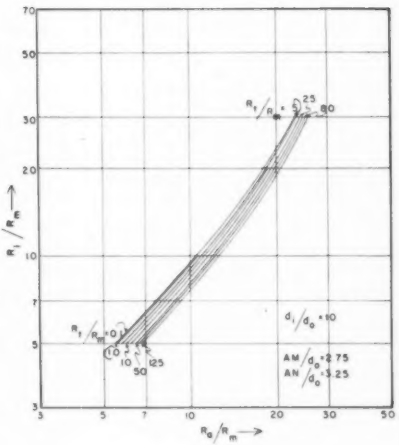


Fig. 4

In resistivity logging, the medium surrounding the electrodes is never homogeneous. Nevertheless, the potentials which are registered at given distances from the current electrodes, for a given constant current, are calibrated using this same relation, with the exception that R is substituted by R_a, the so-called "apparent resistivity" of the heterogeneous medium surrounding the electrodes.

The relation $V_s = IR_a/4\pi s$ implies that the magnitude of the potential V_s at distance s is such as if the materials surrounding the electrodes constituted a homogeneous medium of resistivity R_a. As V_s is directly proportional to R_a, the log of the measured potential can be calibrated easily in terms of the apparent resistivity of the formations traversed by the sonde.

The so-defined apparent resistivity is a function of the geometry and resistivities of all the individual regions of which the heterogeneous medium surrounding the electrodes is made up and of the spacing between the current electrode and potential electrodes. In the case of infinitely thick beds the apparent resistivity is therefore determined by the following parameters:

The hole diameter, d_o
The resistivity of the drilling fluids, R_m
The diameter of the zone invaded by filtrate of the drilling fluids, d_i
The invaded zone resistivity, R_i
The true resistivity of the undisturbed formations R_t, and
The electrode spacing, s.

Usually d_o, R_m, and s are known, so that R_a is a function of three known and three unknown parameters.

The first step in the interpretation of resistivity logs is to evaluate the unknown quantities R_t, R_i, and d_i from several measurements of R_a for various electrode spacings and/or electrode arrangements.

Obviously, we must have at least three measurements of R_a if we want to achieve the solution of all three unknowns.

Unfortunately, even three measurements of R_a for three different spacings do not suffice in most cases to determine the unknowns with sufficient accuracy. This is due to the fact that any combination of d_i, R_t, and R_i is electrically equivalent to combinations of other values of d_i, R_t, and R_i for any of the conventional electrode arrangements. In other words, conventional spacings will measure the same potential or potential difference and have therefore the same R_a for each one of a series of these equivalent combinations.

It was shown by L. M. Alpin[1] that this phenomenon should be expected from consideration of the form of the equations relating R_a to R_t, R_i, and d_i. Alpin computed and listed numerical values of apparent resistivities for equivalent combinations of d_i and R_i holding R_t constant.

An excellent extract of the results obtained by Alpin was published by H. Guyod.[2] Mention of the equivalence principle is made in the "Interpretation Handbook for Resistivity Logs," published by Schlumberger Well Surveying Corp.[3]

In spite of these publications the equivalence principle has received fairly little attention and its effects on the accuracy with which R_t, d_i, and R_i can be determined from conventional resistivity logs are mostly neglected. This may be partly due to the fact that in the determination of true resistivity by curve-matching methods using conventional departure curves[4,5] one usually obtains a particular solution, when a good fit is found between an experimental departure curve (giving measured values of R_a/R_m versus the ratio of spacing over hole diameter) and the theoretical departure curves. When one such fit is found it is normally assumed that this particular solution is the only solution for R_t and also for R_i and d_i. The complications of interpolations between curves and charts in the conventional curve-matching procedure obscure the fact that with continued efforts many other theoretical departure curves can be found for other combinations of R_t, R_i, and d_i which will fit the experimental curve equally well.

The equivalence phenomena are much clearer illustrated if we attempt to solve the unknowns R_t, R_i, and d_i in the resistivity equations from three measured values of apparent resistivities for three different spacings by direct graphical methods. The direct graphical methods of resistivity interpretation make use of so-called "simplified resistivity departure curves" which show relations between apparent resistivities and actual resistivities for one given spacing or a combination of two spacings.

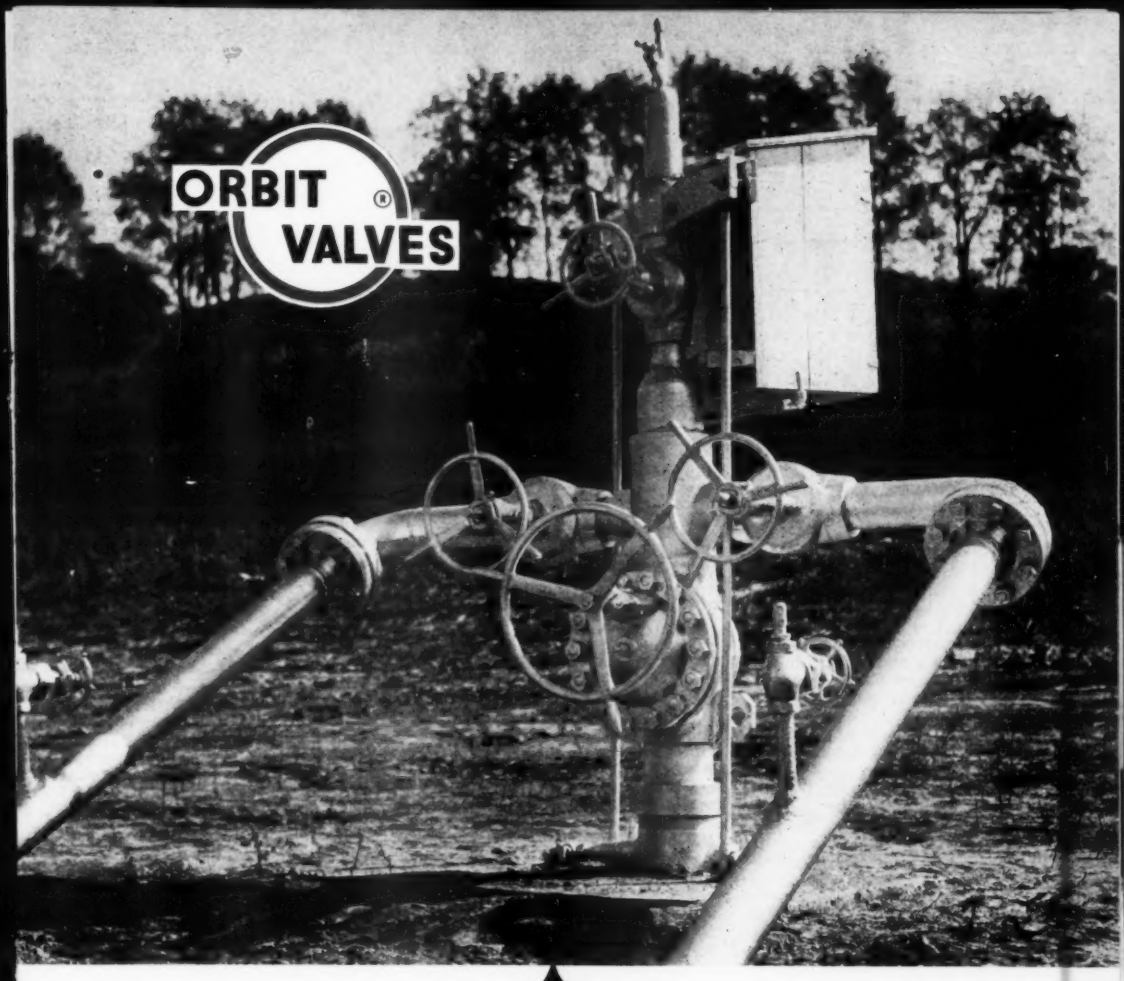
In this article we will discuss the simplified departure curves and the procedure by which the equivalent combinations are outlined by the direct graphical methods of solving the resistivity equations.

The data on which the observations are based consist largely of values for apparent resistivities computed by digital electronic computer at California Institute of Technology and in some cases of values obtained by graphical interpolations from the Schlumberger departure curves.[4]

Only cases of infinitely thick beds are considered in this paper so that corrections for bed thickness can be neglected.

Simplified Departure Curves

Conventional departure curves depict the relation between apparent resistivity, R_a, and the parameters on



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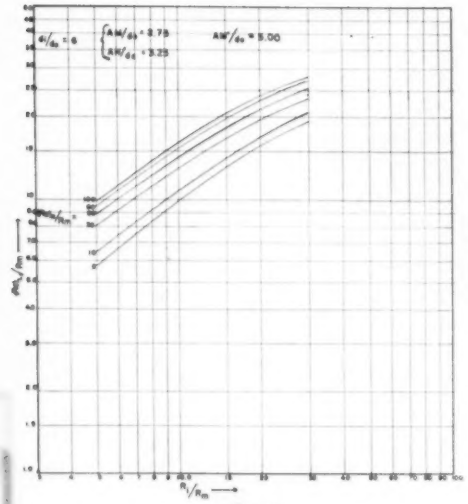

Fig. 5

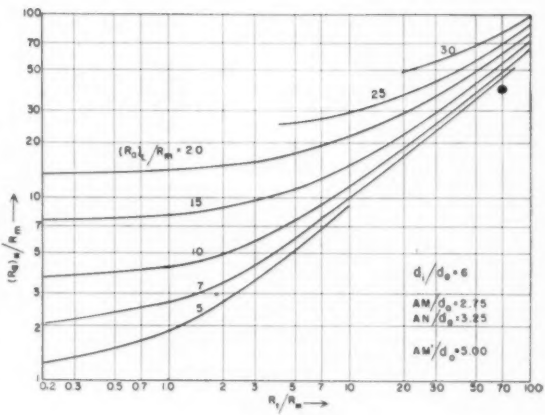

Fig. 6

which it is dependent, in a manner which is illustrated in Fig. 1. The ratio of apparent resistivity over mud resistivity is plotted on the ordinate of a log-log grid. The abscissa carries the quantity AM/d_o or AO/d_o which is the ratio of the electrode spacing over hole diameter. The variations of the quantity R_a/R_m with the parameter AM/d_o are given for various values of the ratio R_t/R_m (true resistivity over mud resistivity). Such families of curves may be presented on one chart for various values of the ratio d_i/d_o (invasion diameter over hole diameter) using different colors or different symbols. Each individual chart is made up for a given value of the ratio R_i/R_m(invaded zone resistivity over mud resistivity).

The simplified departure curves are plotted on charts for given values of ratio AM/d_o or AO/d_o. This permits a plot either R_t/R_m or R_t/R_m as a continuous variable. If, as for small spacings, the variations of R_x for varying invaded zone resistivity are large, R_t/R_m is plotted on one ordinate versus R_a/R_m on the other and a family of curves is made in which each curve depicts the relation between R_a/R_m and R_t/R_m for a given value of R_t/R_m. One family of curves is made for each required value of d_i/d_o. Several families of curves may be combined on one chart using various colors or symbols or a separate chart may be made for each value of d_i/d_o. Fig. 2 shows such chart for a short normal with $AM/d_o = 1$ and for $d_i/d_o = 10$.

If, as for long spacings, R_a/R_m varies strongly with R_t/R_m and is less influenced by R_i/R_m, we plot R_a/R_m versus R_t/R_m for various fixed values of R_i/R_m. Fig. 3 shows an example of this type of chart for $AM/d_o = 6$ and $d_i/d_o = 4$.

Typical advantages of the simplified departure curves are illustrated by Fig. 2. The chart shows the values of R_t/R_m which one may expect for any given value of R_a/R_m for a short normal with a spacing equal to one hole diameter (for instance, for an 8-in. normal in an 8-in. hole). It becomes immediately apparent from this type of plot that the values we find for R_t/R_m are strongly dependent on the value of R_i/R_m. The dashed line in Fig. 2 represents the relation between R_t/R_m and R_a/R_m when $R_i/R_m = R_t/R_m$. This would be the case when we have no invasion or when we assume that the short normal apparent resistivity is not influenced by R_t, so that we can use the departure curves for no invasion to find R_t/R_m from R_a/R_m for the short normal. This latter assumption is one of the basic premises of the Tixier analysis for determination of water saturation and of porosity.

The simplified departure curves show that this assumption may lead to large errors, especially when $R_i < R_t$, even in the extremely favorable case of an invasion diameter equal to $10d_o$ and the very short normal spacing of 8 in. For shorter invasion diameters and/or larger spacings the possible errors become still very much larger. The limitations of the short normal curves in this respect would be much more difficult to detect, using conventional departure curves.

The direct graphical solutions for R_t, d_i, and R_i using simplified departure curves are designed to be used with fixed spacings. A limited number of charts is needed to take into account the variations in the hole diameter. For the fixed spacings we want the apparent resistivity for one to be strongly influenced by R_t and for the other by R_i. An example of such combination would be a long normal with $AM'/d_o = 6d_o$ and a short lateral with $AO/d_o = 3$. Fig. 4 shows a set of simplified departure curves for a short lateral with $AO/d_o = 3$ for $d_i/d_o = 10$. Comparison with Fig. 2 demonstrates clearly that the short lateral is less dependent upon R_i than the very short normal. The interpretation of the limestone curve" is largely based on this characteristic of the short laterals. The short lateral curves are more advantageous to use in combinations of spacings made up for direct solution of R_i and R_t.

Once we have chosen a combination of two spacings and registered their apparent resistivities on a log, it must theoretically be possible to find a value of R_i and R_t from the two measured apparent resistivities for each assumed value of d_i/d_o. Charts of the type of Figs. 3 and 4 are not too well suited to give a simple graphical solution of this problem. From them, however, we can derive graphs that combine the data for the short lateral and the long normal. This may be done as follows:

Let us denote the ratio of the short lateral apparent resistivity over the mud resistivity by $(R_a)_1/R_m$ and that for the long normal by $(R_a)_n/R_m$. From the plot of $(R_a)_n/R_m$ versus R_t/R_m we can find for each fixed value of $(R_a)_n/R_m$ a series of corresponding values of R_i/R_m and R_t/R_m. From the plot of $(R_a)_1/R_m$ versus R_i/R_m for the same value of d_i/d_o, we can find a value of $(R_a)_1/R_m$ for each one of the above combinations of R_i/R_m and R_t/R_m. This means that for a fixed value of $(R_a)_n/R_m$ we can find a value of $(R_a)_1/R_m$ for each chosen value of R_i/R_m. We then can make a family of curves representing the relation between $(R_a)_1/R_m$ and R_i/R_m for fixed values of $(R_a)_n/R_m$. Fig. 5 is an example of such chart.

Conversely, if we start out with the chart for $(R_a)_1/R_m$ versus R_i/R_m we obtain for fixed values of $(R_a)_1/R_m$ combinations of R_i/R_m and R_t/R_m with corresponding values of

$(R_a)_n/R_m$. This enables us to plot $(R_a)_n/R_m$ versus R_t/R_m for fixed values of $(R_a)_1/R_m$. Fig. 6 shows an example of such plot for $d_i/d_o = 6$, $AO/d_o = 3$, and $AM'/d_o = 5$. Charts of the type of Figs. 5 and 6 are direct reading to the extent that only simple interpolations between curves are needed to find the values of R_i and R_t for any assumed d_i/d_o.

As we change the assumed value of d_i/d_o the resulting values for R_i and R_t will also change. This is direct proof of the fact that analysis using departure curves gives no unique solution for R_t and R_i if we use only two measured values of apparent resistivity.

Equivalent Combinations

The graphical solution using two given spacings and simplified departure curves as discussed above, result in one pair of values of R_i/R_m and R_t/R_m for each assumed value of d_i/d_o.

In this way the measurement of two apparent resistivities leads to a series of possible solutions. To obtain a unique solution for R_i/R_m and R_t/R_m we need a third independent equation relating R_i/R_m, R_t/R_m, and d_i/d_o to a third measured quantity.

An obvious suggestion is that any third measured apparent resistivity would provide such relationship. To increase the possible resolution we should probably choose a spacing for which the apparent resistivity is influenced strongly both by R_i and by R_t, say for instance, a normal spacing of intermediate length (3 or 4-hole diameters).

For this third spacing we can plot a set of charts of simplified departure curves similar to Fig. 4. This permits us to compute the apparent resistivity we should measure with the third spacing for each one of the possible combinations of R_i/R_m, R_t/R_m, and d_i/d_o obtained from the first two spacings. The actually measured apparent resistivity for the third spacing should then decide which one of these combinations was present in the formation under investigation.

If we follow this procedure we find, however, that the computed apparent resistivity for the third spacing for one of the combinations is equal to the apparent resistivity computed for any one of the other possible combinations. Further investigation shows that no matter which normal spacing we choose (within the limits of conventional spacings), the computed apparent resistivities for the third spacing are practically identical for each one of the possible combinations, derived from the first two spacings.

Table 1 gives an illustration of the phenomena discussed above. For the first two spacings a combination of a long normal with $AM = 5d_o$ and a short lateral with $AO = 3d_o$ was chosen. From various pairs of values of the apparent resistivities for these spacings, the possible solutions for R_i/R_m and R_t/R_m were computed assuming for d_i/d_o values of respectively 2, 4, 6, 8, and 10. The combinations are listed in the first three columns of Table 1. The values of apparent resistivities corresponding to these combinations were then computed for normal spacings ranging from $1d_o$ to $10d_o$.

TABLE 1

Equivalent combinations			R_a/R_m (normal spacings) AM/d_o									R_a/R_m, short lateral AM'=2.75d_o, AN=3.25d_o
d_i/d_o	R_i/R_m	R_t/R_m	1.0	2.2	2.75	3.3	4.0	5.0	6.0	6.67	10	
2	14.3	3.95	6.65	7.00	6.79	6.29	5.83	5.6	4.7	4.63	4.4	8.8
4	9.3	3.6	6.5	7.00	6.65	6.41	5.85	5.6	4.65	4.4	4.2	8.8
6	8.4	3.1	6.6	7.01	6.70	6.38	5.90	5.6	4.6	4.3	3.95	8.8
8	8.1	2.6	6.6	7.08	7.00	6.50	6.0	5.6	4.65	4.25	3.7	8.8
10	7.8	2.35	6.5	7.00	6.95	6.59	6.1	5.6	4.75	4.4	3.6	8.8
2	3.65	16.5	10.3	15.5			18.7	20.8		19.2	20.5	11.6
4	8.0	19.4	10.6	16.01	17.4	18.7	19.7	20.8	21.6	21.6	22.2	11.6
6	9.05	21.0	10.7	15.90	17.0	18.55	19.5	20.8	21.5	22	23.1	11.6
8	9.6	22.2	10.8	15.3	17.0	17.85	19.2	20.8	21.2	21.8	24.0	11.6
10	9.9	24.0	10.7	15.35	16.95	17.95	18.95	20.8	21.0	21.95	24.2	11.6
2	20	10	10.75	14.10	14.5	14.55	14.45	13.75	13.2	12.9	11.4	14.4
4	15.3	9.6	10.5	14.05	14.6	14.60	14.40	13.75	13.0	12.7	11.3	14.4
6	14.5	8.9	10.65	14.00	14.5	14.45	14.40	13.75	12.9	12.3	10.7	14.4
8	14.3	7.6	10.7	14.00	14.4	14.60	14.40	13.75	12.5	11.8	10.0	14.4
10	14.25	7.5	10.6	14.30	14.85	14.90	14.60	13.75	13.0	12.2	10.2	14.4
2	20	50	26.0	44.60	50.05	55.0	59.3	64.4	66	66.3	69	27.6
4	32	53.8	27.0	44.60	51.0	56.2	59.0	64.4	67.5	67.2	71	27.6
6	35	55.8	25.8	44.62	50.06	55.0	59.4	64.4	67.0	68	71.0	27.6
8	36.2	57.2	26.0	45.00	50.2	54.95	59.6	64.4	67.0	67	73.5	27.6
10	36.5	59.0	25.5	44.60	49.75	54.25	57.7	64.4	66.5	66.5	72.5	27.6

The listed values (Table 1) show clearly that none of the conventional normal spacings is capable of resolving between the possible combinations. The combinations have, therefore, been termed "equivalent combinations." They are manifestations of the equivalence principle, which is based on the fact that three equations relating apparent resistivities to d_i, R_i, and R_t for three conventional normal spacings, are for practical purposes not three independent equations. If we measure the apparent resistivity for two normal spacings, we can predict the third. The small variations shown in the listed values of R_a/R_m are mostly due to the small inaccuracies inherent to the graphical solutions. The values for $AM/d_o = 1.0$ and $AM/d_o = 10$ were obtained by laborious interpolation procedures from the Schlumberger departure curves for the normal device. The values for the other listed spacings are derived from simplified departure curves computed directly for these particular spacings by digital computing methods.

It is obvious that even a fourth or fifth normal spacing will add nothing to the resolution between the equivalent combinations. This means that if we were to plot conventional departure curves giving R_a/R_m versus AM/d_o for the normal device ,and a range of spacings with $1d_o < AM < 8d_o$ for each one of a series of equivalent combinations, all these departure curves would, for practical purposes, be identical. In other words, the curve-matching procedure as suggested by Doll et al,[6] using departure curves for the normal device, does not give a unique solution for d_i, R_i, and R_t for the usual ranges of normal spacings.

We notice that the apparent resistivities for the normal spacing with $AM = 10d_o$ begin to show some differentiation between the "equivalent combinations." This means that the departure curves for the respective combinations start diverging slightly for the long normal spacings. The behavior of the apparent resistivities of long spacings with respect to the equivalent combinations will be discussed further in the next section of this article.

From Table 1 we see that the equivalence principle holds as well for cases where $R_t > R_i$ as for cases where $R_i > R_t$.

It is interesting to note that the variations in R_i and R_t between successive combinations is largest in the region of small invasion diameters. For larger invasion diameters the variations between the equivalent combinations become gradually smaller. This observation is, in some ways, analogous to the statement in the article by Guyod[2] that one departure curve may represent varying equivalent combinations when $1.2 < d_i/d_o < 4$.

The errors resulting by neglecting the equivalence principle and using the curve-matching solution for the determination of R_t will be especially large in all regions where invasion diameters are moderate or small. The universal use of low-water-loss muds will increase the number of fields in which these conditions occur. The areas where sandstone reservoirs of very high porosities are predominant, such as most of the Gulf Coast regions, will exhibit the lack of resolution in the determination of R_i and R_t by the curve-matching method very strongly.

Very Long Normal and Long Lateral Spacings

We have seen that conventional normal spacings do not provide a means of distinguishing between the equivalent combinations. It is well known that long lateral and very long normal spacings in some cases

TABLE 2

Equivalent combinations			R_s/R_m long normal	R_s/R_m long lateral AO/d_o			R_s/R_m Laterolog-7*			R_s/R_m† induction sonde
d_i/d_o	R_i/R_m	R_t/R_m	AM—15d_o	20	30	40	a=1d	a=2d	a=3d	6FF27
2	14.3	3.95	4.25	4.05	3.9	3.9	5.1	5.45	5.5	4.30
4	9.3	3.6	3.98	3.98						5.22
5	8.7	3.37	3.65	3.80	3.73	3.6	4.53	4.08	3.48	5.39
6	8.4	3.1	3.7	3.70						5.57
8	8.1	2.6	3.3	3.42						5.68
10	7.8	2.35	3.2	3.4	3.5	2.75				5.71
2	3.65	16.5	18.3	22.0	21.0	19.75	12.3	13.8	15.6	7.70
4	8.0	19.4	21.0	24.4						8.32
5	8.68	20.4	22.3	24.7	24.8	24.0	11.8	15.8	18.0	8.25
6	9.05	21.0	22.5	25.2						8.28
8	9.6	22.2	24.0	25.5						8.37
10	9.9	24.0	25.2	24.5	25.5	26.0				8.45
2	20	10	10.9	11.4	10.55	10.1	10.65	11.6	12.5	8.95
4	15.3	9.6	10.4	11.15						9.74
5	14.75	9.3	10.4	11.0	10.0	9.6	10.4	11.25	11.8	9.71
6	14.5	8.9	10.2	11.0						9.96
8	14.3	7.6	9.3	10.9						9.96
10	14.25	7.5	9.3	10.9	9.4	9.2				10.13
2	20	50	66	76	68.0	62	39.0	45	50.0	19.65
4	32	53.8	68	76.8						19.68
5	33.9	55	70.5	78.5	71.5	66	38.5	47.2	51.0	19.1
6	35	55.8	71.5	80.5						19.68
8	36.2	57.2	72.5	79.0						19.76
10	36.5	59.0	73	76.0	73.0	68				19.72

*Assume $R_m = 1$ ohmmeter and spread ratio = 2.5. †Assume $R_m = 1$ ohmmeter and $d_o = 12$ in.

give a fair approximation of true resistivity, when we correct the apparent resistivity for hole effect.

The question arises whether these spacings can approximate true resistivity close enough to provide resolution between the equivalent combinations. Table 2 shows a list of apparent resistivities for a normal spacing of 15d_o and lateral spacings of respectively 20d_o, 30d_o, and 40d_o.

The data show that the very long normal and the lateral spacings with AO≥30d_o exhibit a fair amount of resolution between the various combinations. This is to be expected, as the apparent resistivities of the very long spacings begin to approximate the actual values of true resistivity and therefore must be different for combinations with different values of R_t.

In very thick homogeneous sections, it should be possible, therefore, to arrive at a set of possible solutions for R_t, R_i, and d_i using a short lateral (or short normal) and a long normal spacing and then find the particular prevalent solution by resolution between the possible combinations using a very long lateral spacing.

In the majority of practical cases, however, the very long spacings are influenced strongly by the effects of adjacent beds and the curves are distorted by boundary phenomena. Inaccuracies induced by these effects will often offset the gain in theoretical resolution.

In thin beds or in thick formations containing thin shale streaks or dense layers, the accuracy of the long spacings is usually reduced to the point where they cannot be used for work requiring the amount of precision necessary to distinguish the equivalent combination and arrive at a unique solution. The number of cases where the long lateral curves can be applied successfully to this problem would be considerably increased if adequate correction curves for the bed thickness effects on long laterals were available.

Laterolog and Induction Log

As the equivalence principle is nothing more than an expression of a nearly identical distribution of current in the hole for the various equivalent combinations in conventional electric logging, it may be expected that the combinations are not necessarily equivalent to logging methods that use an entirely different system of current distribution. Both the Laterolog and the induction log make use of current paths radically different from those in conventional logging. For the Laterolog the current is distributed essentially in two dimensions only, that is, the current spreads radially but not vertically.

In induction logging we make use of induced currents that are concentric with the hole and do not cross the bore face or the boundary of the invaded zone. It is of particular interest to see whether these new logging methods provide the necessary resolution between the equivalent combinations as both types of logs are focusing logs which have a minimum amount of adjacent bed effects and boundary distortions.

Table 2 lists the apparent resistivities for the Laterolog corresponding to equivalent combinations for $d_i/d_o = 2$ and $d_i/d_o = 5$. The data are listed for three ratios of spacing to hole diameter (a/d_o), namely a/d_o = 1, 2, and 3. The data were computed from departure curves for the Laterolog distributed by Schlumberger Well Surveying Corp.

We see from the data of Table 2 that Laterolog shows a small amount of resolution in some cases and practically none in other cases. The reaction of the Laterolog in this respect seems to be more dependent upon the absolute magnitude of the resistivities involved than on the relative magnitudes of R_i and R_t. Whether R_i is larger or smaller than R_t appears to have no particular bearing on the resolution. More work will be needed to determine the exact limits of the applicability of the Laterolog to this problem.

The last column of Table 2 lists the apparent resistivities of the six-coil induction log for the various equivalent combinations. The data were computed with the use of Schlumberger's geometric factor curves, assuming $R_m = 1$ ohmmeter, $d_o = 12$ in., and infinite bed thickness. The induction log shows only resolution where the resistivities are low and invasion diameters are small ($d_i < 4d_o$). This can be explained on the basis that for high resistivities the induction-log sensitivity is small and the radius of investigation of the induction log is too small to show differentiation between combinations that have a large invasion diameter.

Although the Laterolog and induction log show some promise of solving the equivalence problem in various particular cases, there appears to be a definite need for a type of log that can be used in formations with limited bed thickness and that will universally show sufficient resolution between the possible equivalent combinations to always give a unique solution for invaded zone resistivity, invasion diameter, and true resistivity.

Acknowledgments

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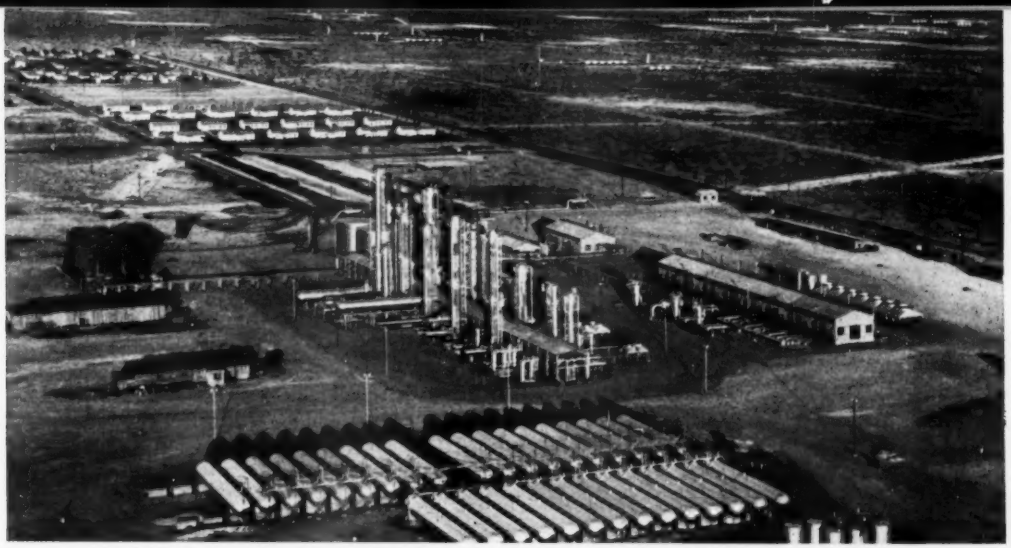


This field processing plant, operated by Pure Oil Co., is located in Andrews County, Texas.

Four-Horizon Dollarhide's Casing-Head Gas Processed in New Gasoline Plant

Compression-absorption-type unit selected. Pure Oil designated as operator

by J. R. McChesney

DOLLARHIDE oil field is located in the extreme southwest corner of Andrews County, Texas, adjacent to the New Mexico State line, and is in a class with other important fields of the West Texas area. Although presently developed leases cover only approximately 6,000 surface acres of land, the presence of four separate producing reservoirs, the lower Permian, Devonian, Fusselman, and Ellenburger, under most of this area makes the field comparable in size to some of the larger West Texas fields. The development of the three deeper reservoirs is now nearing completion but drilling is still active to develop the lower Permian formation.

All operators participate. — While active development was being carried out in the three deeper reservoirs it became apparent that the casing-head gas produced with the crude oil would be of appreciable magnitude when the field was completed. Accordingly, all field operators considered the advisability of the construction and operation of a gasoline plant to process the casing-head gas to be produced from Dollarhide field.

A construction and operation agreement was entered into by all field operators covering the construction and operation of a gasoline plant known as Dollarhide Gasoline Plant. Pure Oil Co. was designated to be the operator of the plant.

J. R. McCHESNEY

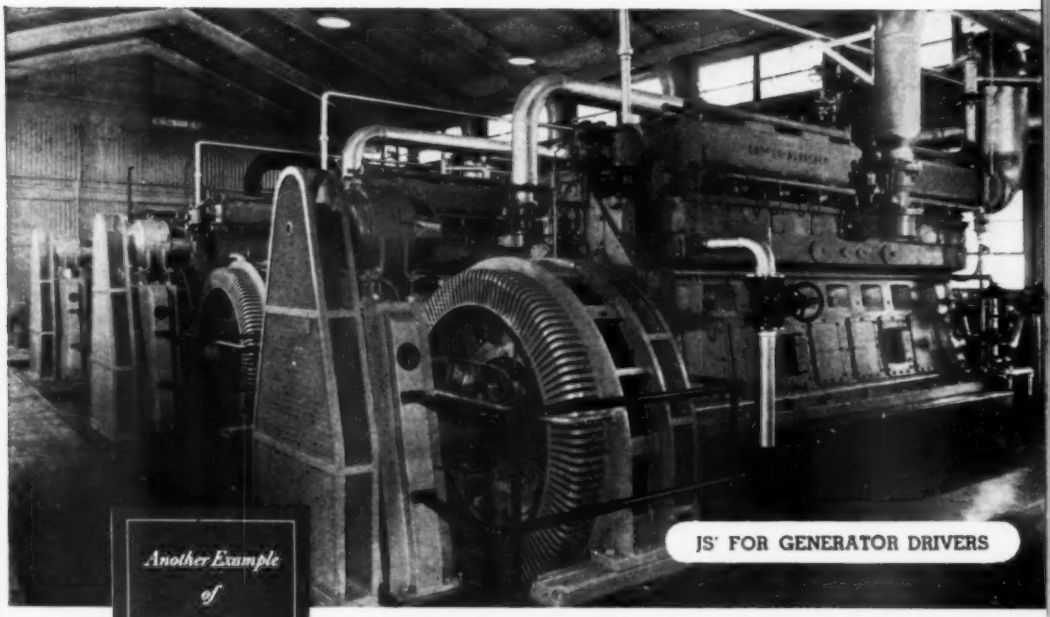
General superintendent, gas department, Pure Oil Co.

Natural Gasoline, Residue Sales, Gas Lift

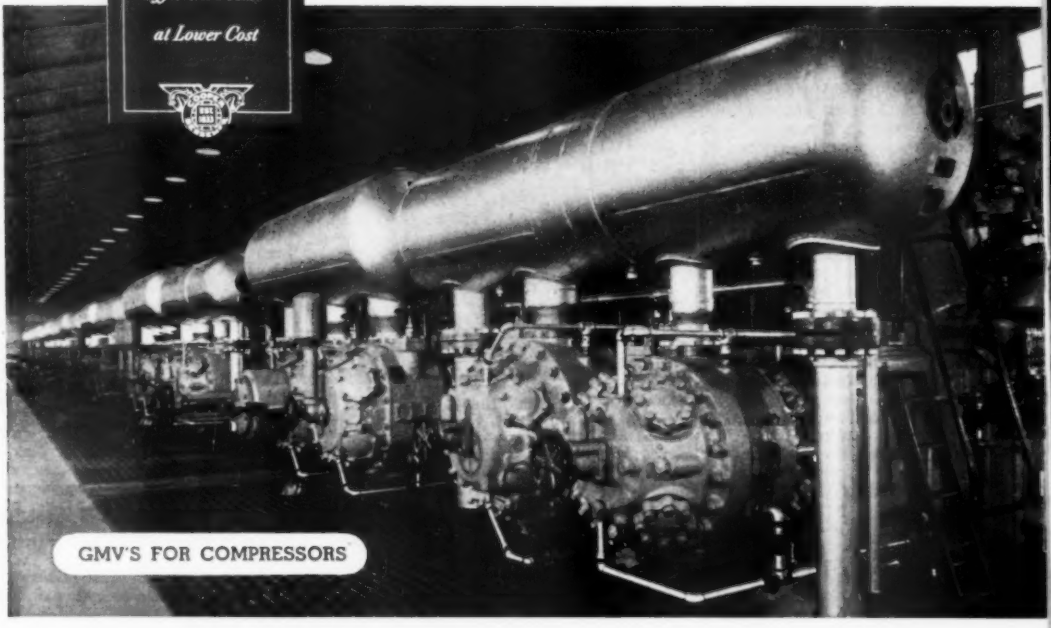
The conventional compression-absorption type gasoline plant was selected as the process best suited for the processing of casing-head gas in this field. The sale of surplus residue gas required compression above 600 psi. and a minimum of 600-psi. pressure was selected for gas furnished for gas lift. The design of compressor facilities can accommodate additional compressor units up to a capacity of 80 million cubic feet daily.

Casing-head gas, including return gas-lift gas, after being compressed, is split and handled in two different manners. The volume of compressed gas representing gas-lift gas is not processed for the removal of hydrocarbons other than the condensate removed by compression; however, the compression condensate from such gas is fractionated so as to achieve virtually 100 per cent recovery of propane and heavier hydrocarbons contained in the compression condensate. That volume of compressed gas representing the formation gas, exclusive of return lift gas, is processed so as to achieve a recovery of 75 per cent of the propane, 98 per cent of the butanes, and substantially 100 per cent of the pentanes-plus content, based on inlet composition. The absorption, distillation, fractionation, and treating facilities were installed to provide capacity for the divided manner of handling and intended recovery of the hydrocarbons contained in the gas compressed.

The design and construction of Dollarhide Gasoline Plant were planned to provide capacity for the processing of casing-head gas to be produced in Dollarhide field and to compress gas as needed for gas lift as a means of producing oil at such time as arti-



Another Example of Efficient Power at Lower Cost



COMPRESSORS-GAS ENGINES-DIESELS

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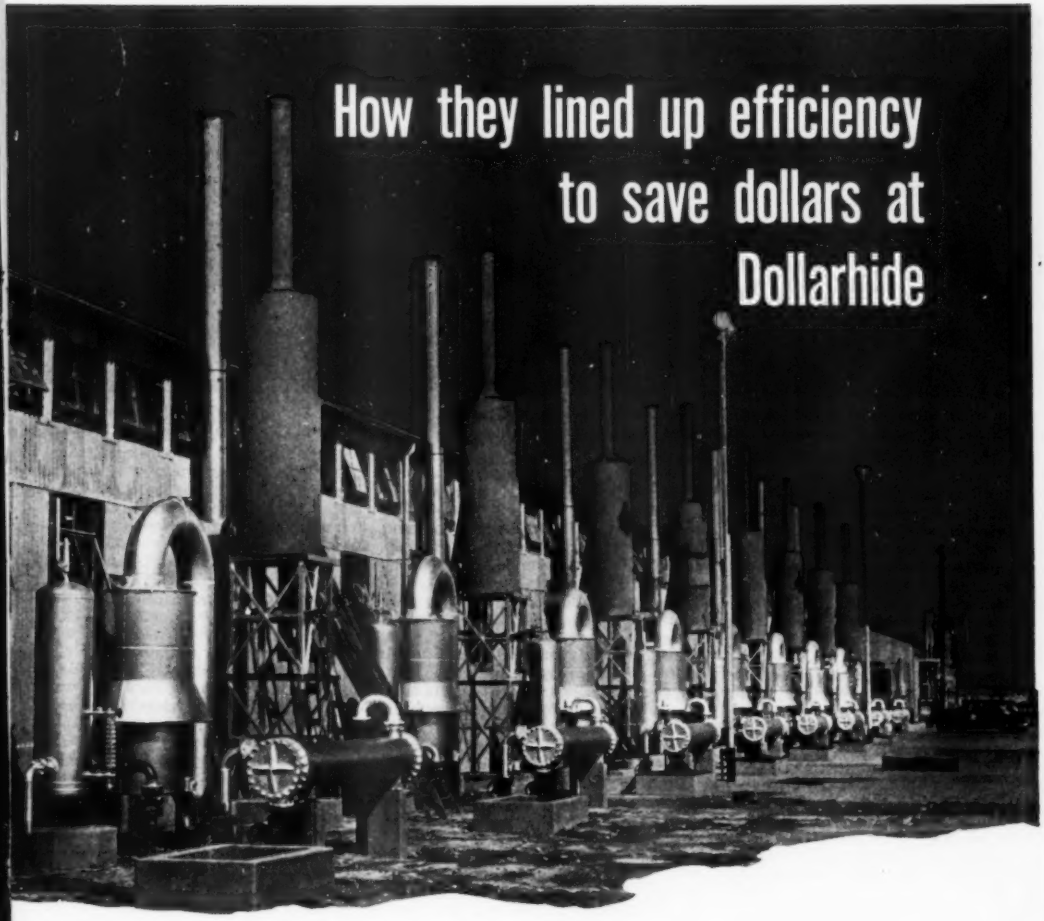

How they lined up efficiency to save dollars at Dollarhide

• The Dollarhide Plant, operated by The Pure Oil Company, is a "beautiful" plant, say those who have seen it—one of the newest, most efficient gasoline plants today.

Those Cooper-Bessemer GMV compressors and JS gas engines do make an impressive line-up, but more important, they *line up* a combination of reliability and efficiency you just can't beat. That's why they're on this and so many other important jobs.

The compressor-line consists of eight 10-cylinder GMV's, all supercharged, for a total of 10,040 compressor hp (at 3150' elevation). Each is a 3-stage compressor, zero suction to 650 lbs. discharge, with automatic speed control and manually operated unloading. This minimizes maintenance and attention without risking a suction pressure drop that would allow air to enter the sour gas stream.

There are modern Cooper-Bessemer V-angles . . . GMV's, GMX's and GMW's from 220 to 3,000 bhp . . . that will efficiently meet your needs no matter how exacting or complex.

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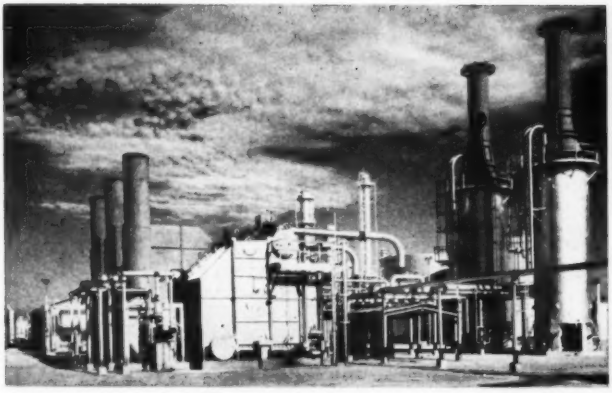
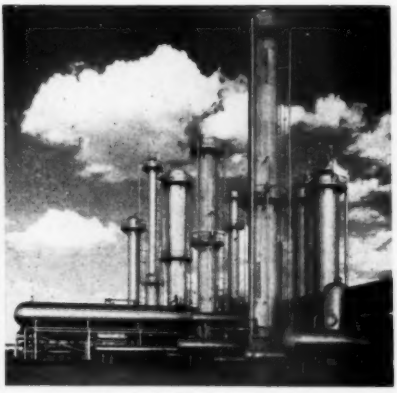


Steam generators and rich-oil heaters at the Dollarhide plant. Steam is utilized in various processing operations including powering of turbine-driven pumps.



View of the Dollarhide installation showing fractionators in the north portion of the plant.

ficial lift means are required. Design of the plant included the necessary facilities for the compression, purifying, and dehydration of the casing-head gas handled so that surplus residue gas, after meeting the requirements for the development and operation of the field, would meet the specifications provided for in gas-sales contract.

The gas-gathering system was installed for a low-pressure drop for the delivery of gas to the plant intake at substantially atmospheric pressure. However, because of the presence of hydrogen sulfide, intake pressure is maintained slightly above atmospheric. In each of the gathering systems, gas is passed through an inlet scrubber for the removal of fluids before entering plant intake line. Further scrubbing of the inlet gas is accomplished by a suction scrubber at the compressor stations.

Three-stage compression.—The compression of the gas from atmospheric pressure to 650 psi. is accomplished by three stages of compression in the conventional fashion. Individual compressor units have been installed as needed and are planned for installation as requirements increase.

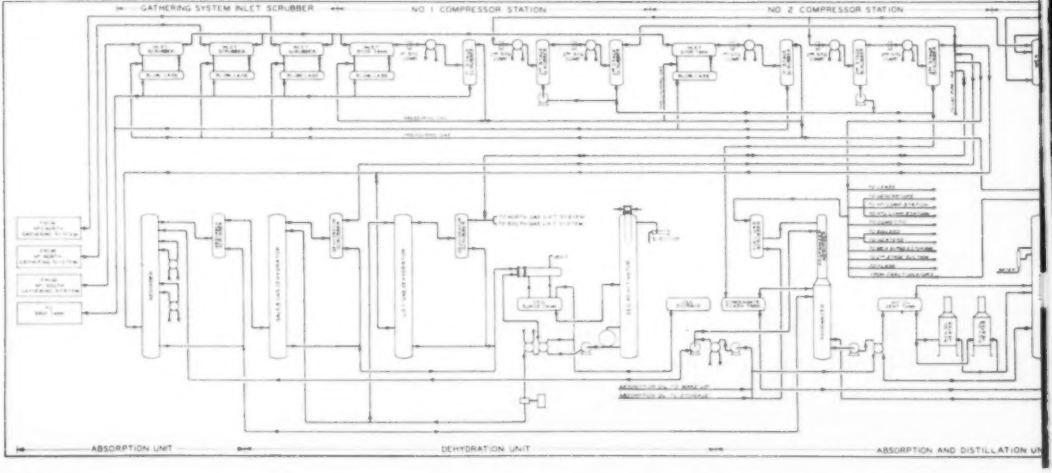
The compressor units were provided with manual unloading on the compressor cylinders and the engines were equipped with automatic speed control between the ranges of 75 and 100 per cent speed rating. Safety and shutdown devices were provided for the compressor station, having such items as power-cylinder-jacket high-temperature shutdown, lubricating-oil high-temperature shutdown, and over-speed shutdown.

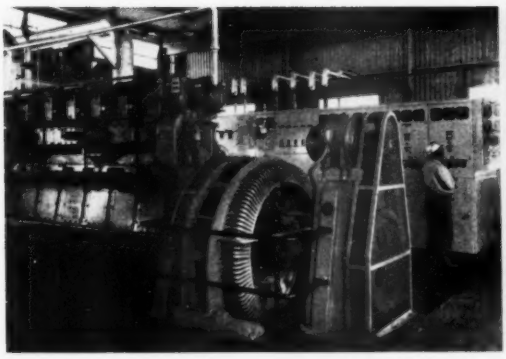
Also, two cooling-water systems were provided, both of which are air cooled, one system serving power-cylinder jacket cooling and the other system serving compressor-cylinder and lubricating-oil cooling. In each of these two cooling systems, valves were installed for the automatic regulation and maintenance of desired water temperatures. These two systems are of the closed type to minimize makeup.

H_2S and CO_2 Removed

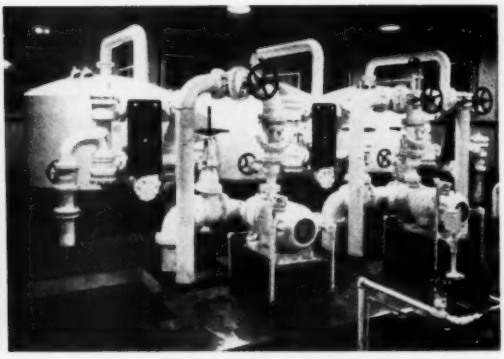
All gas from the discharge of the first stage of compression, after being cooled and scrubbed, passes through monoethanolamine contactors for the removal of hydrogen sulfide and carbon dioxide. The purification in the contactors is accomplished with bubble-tray contact with a water-monoethanolamine solution. Virtually all hydrogen sulfide is removed as the residue gas after absorption and dehydration tests less than 0.1 grain of hydrogen sulfide per 100 cu. ft. The water-monoethanolamine solution is continuously reactivated in a bubble cap-type tower. The acid gas removed is cooled by air-cooling equipment and the liquid condensed is returned to the top of the reactivator tower.

Sales-gas dehydrator.—The volume





Power panel and one of two generator units at Dollarhide.



Filters and pumps for the plant's water-treating system.

of gas representing the intake volume of formation casing-head gas passes through an absorber having two intercoolers. The stripped residue gas from this absorber passes through a sales-gas dehydrator. From the dehydrator, the residue gas is diverted to meet the requirements for fuel for plant or lease operation and the sale of surplus. A portion of the gas from the discharge of the compressor station representing the return gas-lift gas bypasses the absorber and passes through a lift-gas dehydrator for dehydration, from which the lift gas passes to the field at 600-psi. pressure for the lifting of oil, returning to the plant by way of the gas-gathering system and commingled with regular formation gas.

The dehydration of both gas streams is accomplished by bubble-tray contact with a diethylene-glycol solution. The reactivation of the diethylene-glycol solution is accomplished in a bubble-tray tower with a builtin top condenser. The diethylene-glycol reactivator is operating at approximately 21 in. vacuum in order to reactivate the solution at a sufficiently low temperature to minimize decomposition of the diethylene-glycol. Plant operation has proved the merits of this type operation and has resulted in reduction of the water content of the dehydrated gas to as low as 3 lb. per million cubic feet. Vacuum is maintained on the diethylene-glycol reactivator by a steam vacuum ejector.

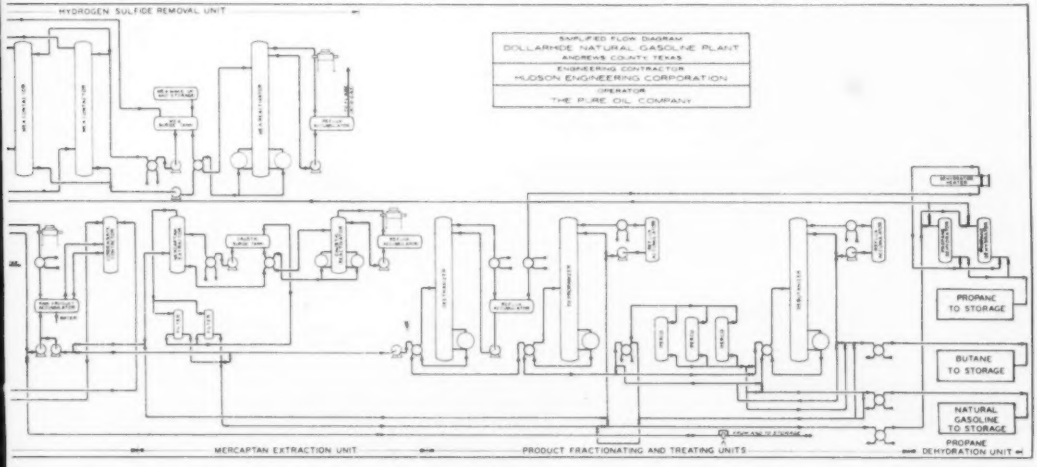
The first-stage compression condensate is treated by a water-monoethanolamine solution to remove the hydrogen sulfide. The second and third-stage compression condensate is virtually free of hydrogen sulfide and is mixed with the treated first-stage condensate and passed to a condensate flash tank where the flash vapors pass to the propanizer absorber.

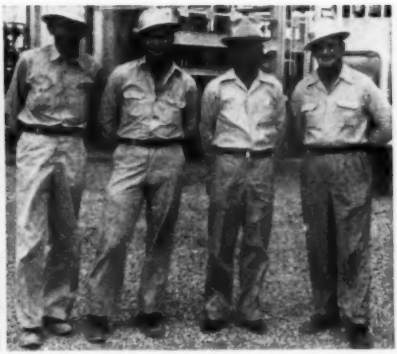
Absorption Facilities

The absorption oil from the high-pressure absorber is passed to the propanizer absorber for the demethanizing of the fat absorption oil. The removal of the methane from the fat absorption oil in the propanizer absorber is accomplished without heat by the stripping action of vapors from the condensate contactor. The residue gas from the propanizer absorber is used for fuel requirements and any excess or surplus not needed is passed to the suction of the second stage of compression for recompression (normally all residue gas from the propanizer absorber will be required for plant and lease fuel).

The demethanized fat absorption oil from the propanizer absorber is heated from the exchange of heat with oil from the stripper and flashed in a hot-oil vent tank. Vapors from the hot-oil vent tank are passed directly to the stripper and oil from the hot-oil vent tank is passed through the rich-oil heaters and temperature raised to 520° F. and passed on to stripper.

Stripping of the absorption oil from the rich-oil heaters requires very little steam and is accomplished in a conventional manner. Initial cooling of the vapors from the top of the stripper is by air cooling, followed by water cooling. The uncondensed vapors from the stripper are used to demethanize the compression condensate from the condensate flash tank in the condensate contactor. The de-





Compressor section of the Dollarhide field processing installation and supervisory personnel for the over-all operation. Shown left to right are Howard Mays, assistant superintendent; H. R. Craddock, field foreman; George Walker, plant foreman, and J. V. Brubaker, superintendent.

methanized compression condensate from the condensate contactor is passed to raw-product accumulator where it is used as reflux with stripper condensate hydrocarbons as reflux for the top of the stripper. Because of the variation in the content of the gas handled, considerable surge capacity was provided in the raw-product accumulator as well as in the condensate flash tank. This surge capacity has contributed to smooth and efficient operation of the fractionators and product treaters.

Removal of C_2, C_3, C_4

From the raw-product accumulator, a virtually methane-free product is then passed to the deethanizer for the removal of ethane. The ethane removed in the deethanizer is passed to plant fuel system so as to use ethane as fuel for the boilers and gas-fired heaters. The debutanized product from the deethanizer bottom is passed to the depropanizer for the removal of propane. Normally, the bottom product from the depropanizer is propane free but can be varied to contain desired percentage of propane if it is desired to produce directly from the debutanizer overhead an L.P.G. product.

The product from the depropanizer bottom is passed to the debutanizer which is operated to produce the desired vapor-pressure natural gasoline with the overhead product being either pure butanes or an L.P.G. product. The debutanizer was designed to produce a debutanized natural gasoline or a natural gasoline containing any desired percentage of available butanes. Further, the debutanizer was also designed to produce an overhead product from propane-free butanes to an L.P.G. product containing up to 30 per cent propane.

Product Treating

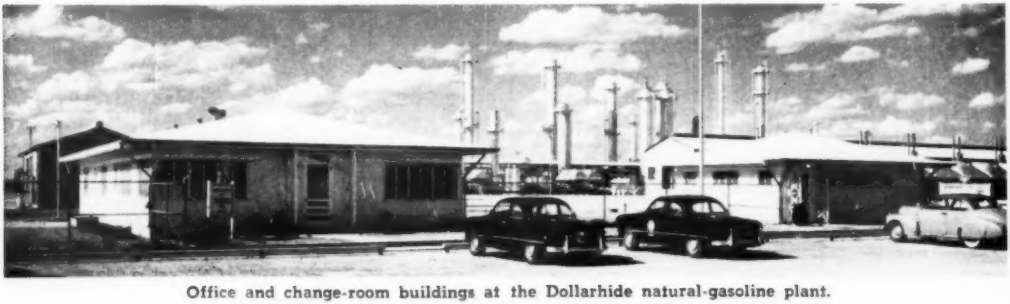
The product-treating facilities include a caustic wash (termed mercaptan extractor) and Perco treaters. The mercaptan extractor or caustic wash tank is so piped as to permit caustic washing of the total raw product feed before being pumped to the deethanizer or, if desired, only the propane can be passed through the mercaptan extractor for caustic wash. The Perco treaters are so piped as to permit the sweetening of the total feed to the debutanizer, or the sweetening separately of the natural gasoline, or the sweetening separately of only the butanes overhead product.

These treating arrangements complicated somewhat the installation and arrangement of heat exchangers and coolers but were selected in order to insure desired treating and then, depending on market outlet of products, to minimize treating whenever possible. Solid-desiccant-type dehydrators are used to dry the propane.

All specifications of the Natural Gasoline Association of America for commercial propane, commercial butane, and natural gasoline are easily met. Likewise, no difficulty has been encountered in meeting the gas specifications of the gas purchaser.

Storage.—Steel storage has been provided at the plant site for approximately 7 days' production of each of the three plant products. The butanes storage is piped so as to permit the separate storage and/or blending of butanes with propane to handle an L.P.G. product up to a vapor pressure of 125 psi. Also, the natural-gasoline storage is so piped as to permit the separate storage and/or blending of natural gasoline with butanes up to a vapor pressure of 40 psi.

Shipping.—Product loading and shipping facilities provide for plant loading of propane, butanes, L.P.G.'s up to a vapor pressure of 125 psi., and natural gasoline up to a vapor pressure of 40 psi. Pipe-line pumps have been installed for shipment by pipe line of butanes and natural gasoline. A railroad loading rack was installed 9 miles west of the plant for the shipment of propane by tank car and at such time as desired, additional facilities can be installed for the tank-car shipment of butanes and natural gasoline. At the present time,



Office and change-room buildings at the Dollarhide natural-gasoline plant.

The Drilling Contractor's Tool Pusher

The Tool Pusher occupies a very important position in Oil Well Drilling. Today, hole is being made 35% faster than ten years ago. Contractor, Drilling Superintendent, and Driller have contributed their part to this result . . . but the Tool Pusher is the man who is most directly responsible for actual drilling efficiency. He is the man who is in over-all, round-the-clock charge of the individual rig, and it is his responsibility to see that time losses are held to the minimum and that the rig operates at top efficiency 24 hours a day, Sundays included.

His job starts when the location is selected. The rig is set up under his personal supervision. He hires the drillers and sees that they maintain capable crews . . . and all operate under his supervision and general direction.

The Tool Pusher arranges for all supplies, inspects all equipment regularly, maintains supply of emergency tools, even *designs* special tools for extraordinary jobs. He recommends procedure to the Drilling Superintendent, assists in planning the drilling, mud, and casing programs, assists the Driller in emergencies, supervises preparation of all reports. He possesses a degree of "know how" that could only be achieved through experience. Practically all Tool Pushers came up the hard way, via service as crewmen and drillers.

Of course, efficient EQUIPMENT is a big factor in the Tool Pusher's success. That is where MISSION fits into his picture. Exhaustive laboratory and field research has been the guiding factor in MISSION design and manufacture. Result: The Tool Pusher has found MISSION products extra-dependable and extra-durable. He has found that they reduce drilling hazards, save equipment dollars, and help hold to the minimum the cost per foot of hole.

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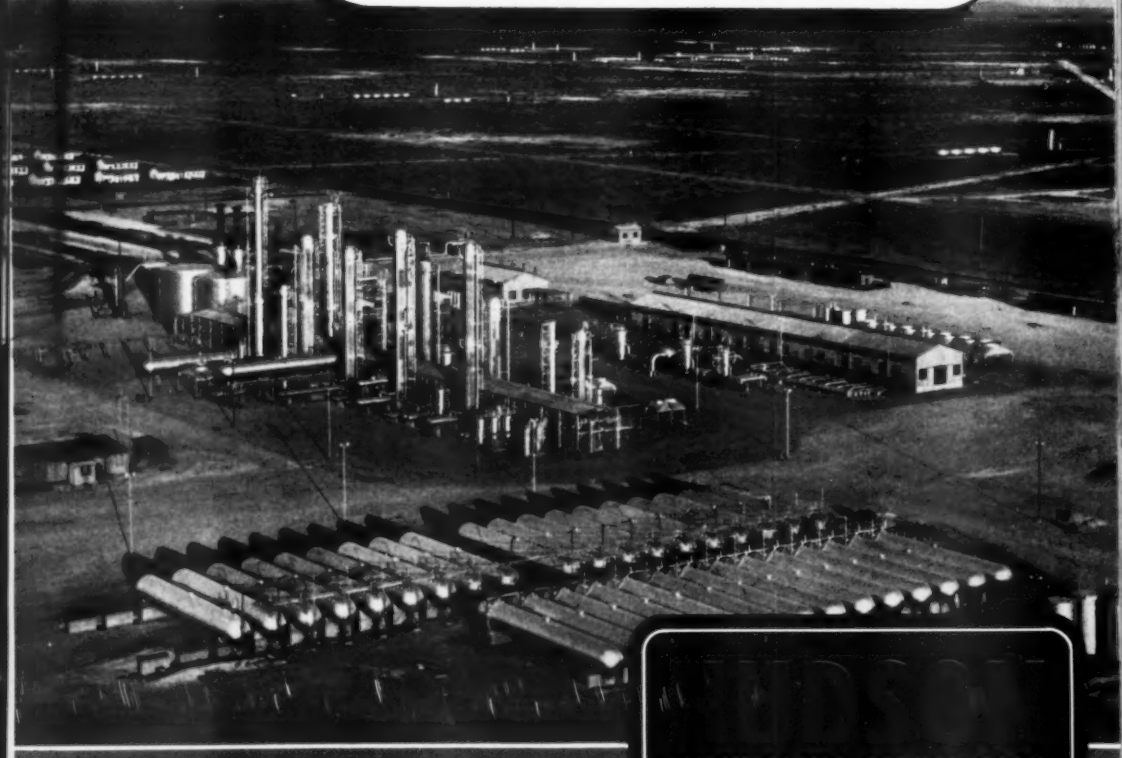
Another

Processing 65 Million Cubic Feet of Gas Per Day In the *Dollarhide Field*

This plant, the most recent of the more than 100 major projects completed by HUDSON, processes all the gas produced in the Dollarhide oil field of Andrews County in West Texas. The gas is compressed to 650 pounds per square inch and treated to remove Hydrogen Sulphide, after which about half of the gas is used for gas lift, and half processed for removal of at least 75% of the propane and essentially 100% of the butanes and natural gasoline.

The plant was designed and constructed by HUDSON in collaboration with engineers of The Pure Oil Company.



ENGINEERING CORPORATION
FAIRVIEW STATION • HOUSTON, TEXAS

propane is being sold by both tank-truck and railroad tank-car movement, and butanes and natural gasoline are being sold by pipe line.

Steam and Power Facilities

Steam at 250 psi. pressure is produced by three water-tube boilers. Sufficient steam capacity was provided to furnish heat requirements, principally for reboilers, from a 50-psi. steam system supplied by the exhaust of turbines operating on the 250-psi. steam. Along with this, turbines were used to power process pumps to the extent permitted by the plant process heating load. Condensate from the reboilers is returned as boiler makeup. In addition, air coolers have been installed to condense a surplus, if occurring, of steam in the 50-psi. steam system in order to save as much water in the steam system as possible.

Some of the process pumps, the loading and shipping pumps, and the water wells are all powered by a.c. current generated in the plant generating station. In addition to furnishing lighting for the plant and plant camp, electricity is also furnished for the different company camps in the field. The generating station consists of four 500-kw., 480-volt a.c. generators powered by direct-connected gas engines. Three generating units are operated continuously with one unit available at all times as a standby.

Water for plant operation is obtained from wells 4½ miles from the plant. Water is treated to reduce the mineral content, not only to prevent damage to plant equipment but also to minimize waste water. Water treatment is fundamentally a lime-soda treatment with filtration after treatment to remove all solids. The water treating plant was installed to operate as near automatic as practical. Storage space for water-treating chemicals was provided in the water-treating building and adjacent to mixing equipment in order to facilitate easy operation.

Construction and Operation

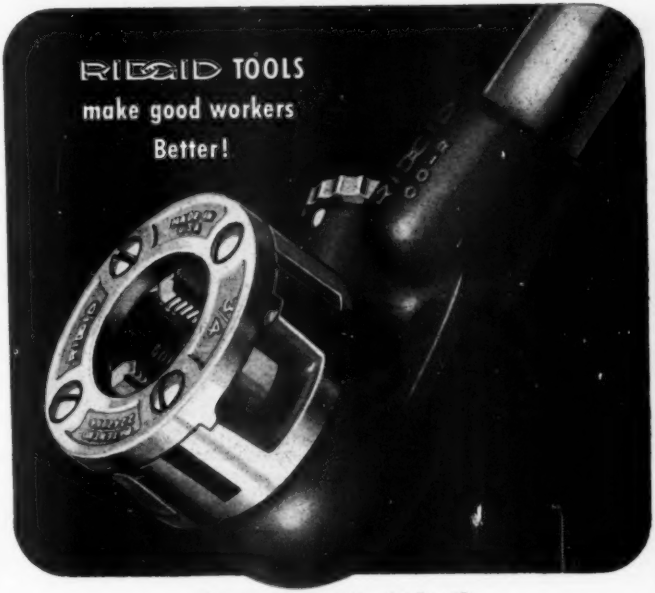
All field operators are also plant owners and have cooperated to the fullest extent in contributing to the successful construction and operation of Dollarhide Gasoline Plant. The plant owners are: F. G. Blackwood, Cities Service Oil Co., Humble Oil & Refining Co., Hunt Oil Co., Lion Oil Co., Magnolia Petroleum Co., John W. Nichols, Pacific Western Oil Corp., Pure Oil Co., Union Oil Co. of California, and W. W. Whiteman, Jr.

Hudson Engineering Corp. was selected for the design and construction of Dollarhide Gasoline Plant. Pure Oil Co.'s supervisory personnel at the Dollarhide Gasoline Plant are J. V. Brubaker, plant superintendent; H. J. Mays, assistant plant superintendent; George Walker, plant foreman; and H. R. Craddock, field foreman.

WHY SKILLED WORKMEN Prefer

RIDGID

Small Ratchet Threaders



Drop head sets to thread ⅛" to 2"

These Drop Head Dies Give You *Extra* Fast Easy Pipe Threading

★ Heads snap into ratchet ring from either side, won't fall out.

★ Precision-cut alloy dies reverse for close-to-wall threads—no special dies needed.

★ 00R & 0R, ⅛" to 1"; 111R and 11R, ⅛" to 1¼"; 12R, ⅛" to 2". Conduit dies available.

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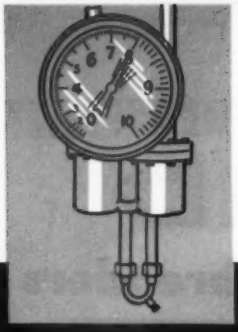
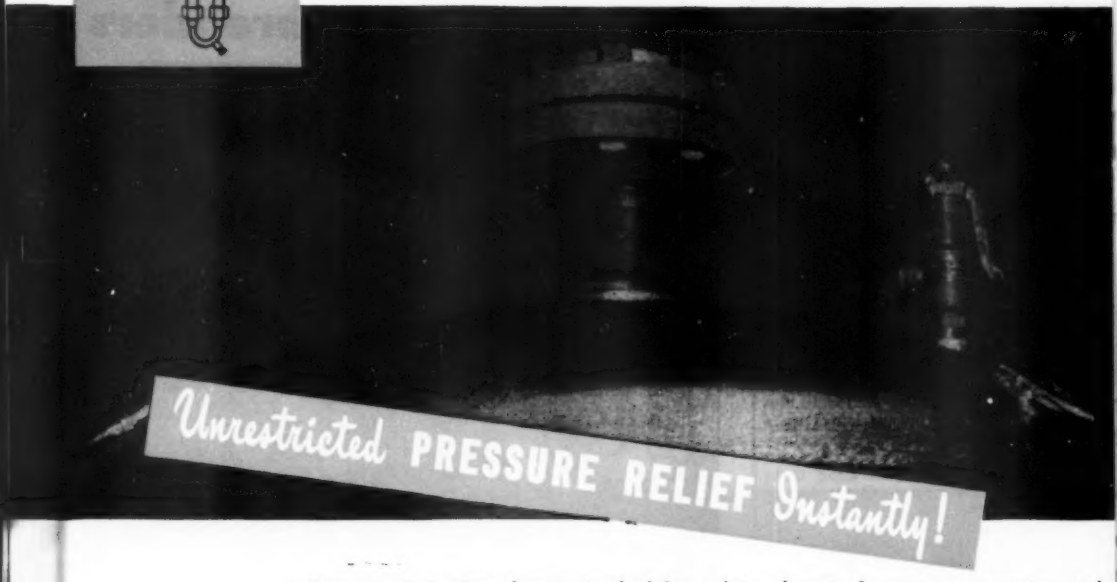
★★★ RIDGID Work-Saver Pipe Tools ★★★



Make BS&B SAFETY HEADS Your Partners in Protection!



Pressure relief valves, long a standard for protecting pressure equipment, do a good job in ordinary pressure relief situations. But new products and processes of chemistry have complicated the problem of pressure protection by increasing the incidence of corrosion, gumming, rust, excessive heat and cold, and violent pressure surges. There are times when a valve becomes plugged up or corroded and fails to function properly, or where pressure builds up so fast that its relieving capacity cannot handle the load.

This new situation has caused the accurate, fast-acting BS&B Safety Head to become an indispensable partner for protecting modern pressure systems. When the rupture disc—a controlled zone of weakness—breaks, it leafs out, giving a full-throated, unrestricted opening.

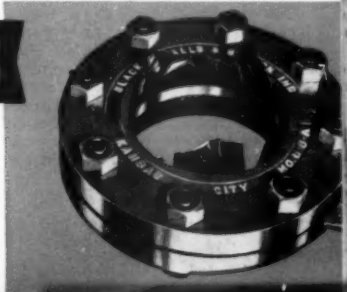
The BS&B Safety Head, a patented pressure relief device, is designed to become an integral part of any pressure system and consists of a preformed metal rupture disc (and a vacuum support, when required) that is held between two specially-machined flanges. The disc is designed to rupture at a predetermined pressure, and is guaranteed, when sold, to rupture within 5%—plus or minus—of its designed pressure at room temperature. By fabricating rupture discs from a wide variety of metals and using protective coatings, Safety Heads can be used with all types of gases or liquids at disc pressures ranging from 5 to 50,000 pounds per square inch.

As a primary relief device, the versatile BS&B Safety Head can be used in series ahead of a relief valve, or at valve outlet.

Solve pressure protection problems by having an experienced BS&B Safety Head Engineer analyze your relief requirements now.

Write today for your copy of the BS&B Safety Head Catalog.

SAFETY BS&B HEADS



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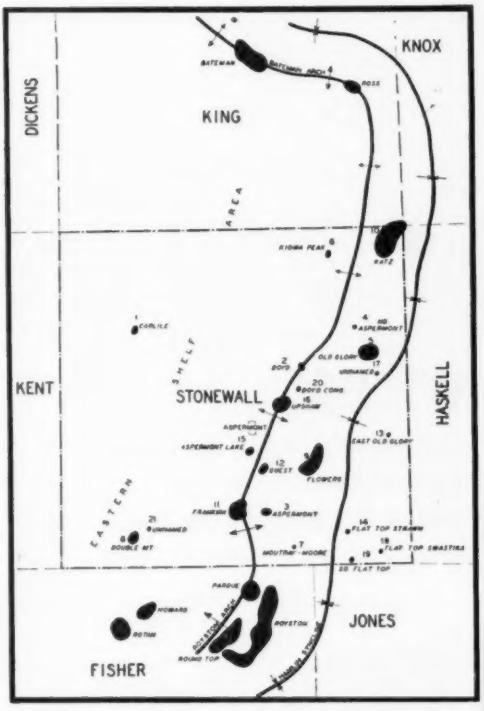
PROGRESS REPORT:

Oil Development in Stonewall County, Texas

"Barring shortages in tubular goods for the coming year, I predict that by the close of 1952, Stonewall County will have increased its production to such an extent that it will be classed as one of the major producing counties of West Central Texas."

by C. S. Noland*



Detailed data for each of these numbered Stonewall County fields are included in text of article.

FIRST commercial oil production in Stonewall County, Texas, was discovered in September 1938. From that date production has increased until on December 1, 1951, there were 21 separate producing fields in the county. As of December 1, 1951, there was a total of 131 producing wells in Stonewall County with a combined total allowable for December 1951 of 339,346 bbl. of oil.

Caliber of the first three producing areas discovered in the county from 1938 through 1942 did not offer much encouragement to the oil operators. Also, numerous dry holes scattered over the county were drilled during the period from 1942 to June 1950.

However, from June 1950 until December 1951 there was discovered 18 separate fields in the county. This is at a sustained rate of one field per month for this 18-month period. Consequently, Stonewall County in this period has advanced from an operator's "graveyard" to one of the better-producing oil counties of West Central Texas.

Producing Horizons

At the present time Stonewall County has been proven to be productive from rocks that range in age from lower Permian down through Ordovician, namely: lower Permian Tannehill sand; Pennsylvanian-Cisco Swastika sand; Pennsylvanian - Canyon sand; Pennsylvanian - Canyon limestone; Pennsylvanian - Strawn sand; Pennsylvanian - Strawn limestone; Pennsylvanian-Caddo limestone; basal Pennsylvanian - Bend conglomerate; Mississippian limestone; and Ordovician Ellenburger dolomite.

Regional Geology

It is not the purpose of this paper to discuss the geology of the individual fields or the county as a whole. However, there appears to be a definite relationship between the location to date and a regional geologic feature that crosses the county (see map).

This unusual regional Ellenburger of the majority of fields discovered feature runs in a slightly east-of-north direction from northeast Fisher County through east central Stonewall County and eastern King County as far north as the Ross field where it changes strike and swings northwest in King County through Bateman field. Along the east side of this regional high is an narrow rather deep syncline.

West from this regionally high feature, the area dips gently westward and becomes a part of the Eastern basin platform or shelf of the West Texas Permian basin. This regional high appears to be the eastern edge of this broad eastern platform area.

The exact age of this regional high has not been definitely established; however, the present evidence establishes it as being at least pre-Pennsylvanian in age. Early Pennsylvanian beds have not been found on this regional high and are thought to be absent due to nondeposition. There is also a westward thinning of Mississippian beds over this feature and it might have been present in late Mississippian time. This evidence suggests that the feature could possibly be pre-Mississippian in age.

Regardless of the age of this feature, it definitely had an influence on Pennsylvanian sedimentation. Along the axis of this feature and on the shelf area to the west, reef limestone and carbonate rocks were deposited, whereas, on the east flank and eastward of this feature, the sediments are predominately clastic sands and shales.

Of the 21 fields discovered to date in Stonewall County, 18 are located along this regionally high feature, leaving only three fields in the western half of the county. These three fields all produce from isolated Canyon reefs. The 18 fields along this regional feature produce from stratigraphic sand traps, structural sand traps, reef limestone traps, and structural limestone traps.

Producing Fields

In chronological order, the following fields have been discovered in Stonewall County up until the present time.

1. **CARLILE.**—Discovery of first commercial oil production in the county is credited to W. I. Southern, Inc. (formerly Swanson & Parriott or Stonewall Oil Co.) 1 H. T. Carlile. This well, located in Section 293, Block D, H&TC, was completed in September 1938 for an initial production of 150 bbl. of oil plus 260 bbl. of water pumping from Palo Pinto limestone of Pennsylvanian-Canyon age at total depth of 5,176 ft.

This field proved to be small in areal extent and consisted of three producing wells, covering approximately 200 acres. The limits have been defined and as of

*District geologist, Skelly Oil Co., Abilene, Tex. Paper presented at technical program, annual convention, West Central Texas Oil and Gas Association, Abilene, December 14, 1951.

December 1951, 2 wells are still producing with a total December allowable of 2,015 bbl.

2. **BOYD.**—Second commercial oil in the county was discovered in May 1939 by Forrest Development Co. 1 C. E. Boyd. This well, located in Section 45, Block D, H&TC, was completed for an initial production of 187 bbl. of oil, plus 33 bbl. of water pumping from Palo Pinta limestone at total depth of 4,760 ft.

This field also proved to be small and consisted of 2 producing wells covering approximately 80 acres.

3. **ASPERMONT.**—In August 1940 the first deep oil was discovered in the county with the completion of Shell Oil Co. 1 T. K. Smith estate. This well, located in Section 143, Block 1, H&TC, was completed for an initial production of 581 bbl. of oil, plus 31 bbl. of water flowing from Mississippian limestone at total depth of 6,065 ft.

In March 1942, Shell 2 Rutherford, after being dry in the Mississippian and Ellenburger, was plugged back and completed as a discovery well from the Pennsylvanian Strawn limestone in Aspermont field. This well, located in Section 144, Block 1, H&TC, was completed for an initial production of 54 bbl. of oil plus 33 bbl. of water at plugged-back total depth of 5,390 ft.

This field has not been completely defined and at present consists of the above two producers and two dry holes.

4. **NORTH ASPERMONT.**—This field was discovered by C. L. Norsworthy, Jr., 1 C. D. Wiley in June 1950. This well, located in Section 14, Block G, was completed for an initial production of 304 bbl. of oil plus 32 bbl. of water flowing from Basal Pennsylvanian Bend conglomerate at total depth of 6,010 ft.

To date this is the lone producer in this field, but its discovery seems to mark the turning point in oil activity for the entire county, and discoveries came fairly regular from this time on.

5. **OLD GLORY.**—This field was discovered by Roark & Hooker and A. G. Hill 1 C. L. Williams in July 1950. This well, located in Section 6, Block C, AB&M, was completed for an initial production of 801 bbl. of oil flowing from Bend conglomerate at total depth of 5,874 ft.

In December 1950, American Trading & Production Co. 2 J. W. Simpson was completed as the discovery well producing from Strawn sand in this field.

As of December 1, 1951, there were 33 producing wells in this field with a December 1951 allowable of 68,916 bbl. The limits are undefined and only one dry hole has been drilled so far in the field.

6. **KIOWA PEAK.**—This field was discovered by Deep Rock Oil Corp. 1 C. B. Long in August 1950. This well, located in Section 2, Block H, GH&H, was completed for an initial production of 106 bbl. of oil pumping and flowing from Strawn sand at total depth of 5,134 ft. At present there are five producing wells in the field and the limits are undefined.

7. **MOUTRAY - MOORE.**—Discovered by Moutray-Moore Drilling Co. 2 W. J. Bryan in October 1950. This well, located in Section 11, Austin and Williams Survey No. 348, was completed for an initial production of 101 bbl. of oil flowing from Pennsylvanian-Cisco Swastika sand at total depth of 3,665 ft. This is a one-well field and the limits are fairly well defined.

8. **DOUBLE MOUNTAIN.**—Discovered by Seaboard Oil Corp. 1 W. F. Edwards in December 1950. This well, located in Section 318, Block 2, H&TC, was completed for an initial production of 222 bbl. of oil flowing from Pennsylvanian Canyon reef limestone at total depth of 5,376 ft. At present there are 11 producing wells in the field and the limits are semidefined.

9. **FLOWERS.**—This field was discovered by Skelly Oil Co. 1 William Flowers in January 1951. This well, located in Section 54, Block D, H&TC, was completed for an initial production of 993 bbl. of oil flowing from Pennsylvanian Canyon sand at total depth of 4,189 ft.

As of December 1, 1951, there were 16 producing wells in this field and the limits are undefined. There have been no dry holes drilled in the field. The field is being developed on a 40-acre spacing and at present covers approximately 640 acres.

10. **KATZ.**—Discovery well was Sid Katz and R. H. Venable 1 H. D. Dozier and was completed in January 1051. This well, located in Ruthy Campbell Survey No. 50, was completed for an initial production of 132 bbl. of oil flowing from Pennsylvanian-Strawn sand at total depth of 4,834 ft.

As of December 1, 1951, there were 40 producing wells in the field and the limits are undefined. There have been no dry holes. The field is being developed on a 40-acre spacing and at present covers approximately 1,600 acres. The December 1951 allowable was 81,282 bbl.

In respect to size and reserves, in the author's opinion, Katz field should be classed as the major discovery for 1951 in West Central Texas.

In October 1951, Charles Katz field should be classed as the major discovery for 1951 in West Central Texas.

In October 1951, Charles Katz 2 Ed Lewis was completed as the discovery well from a deeper Strawn sand in this field.

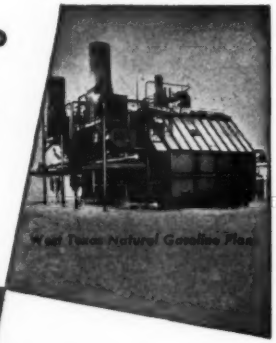
11. **FRANKIRK.**—Discovery well was F. Kirk Johnson 1 Leon Anderson, completed in January 1951. This well, located in Section 18, Block U, T&P, was completed for an initial production of 198 bbl. of oil flowing from Ellenburger dolomite at total depth of 5,941 ft.

At the present time there are 15 producing wells covering 600 acres and the limits are undefined. In addition to the present Ellenburger producing horizon the field has also been proven for Canyon sand, Canyon reef, and Strawn reef production.

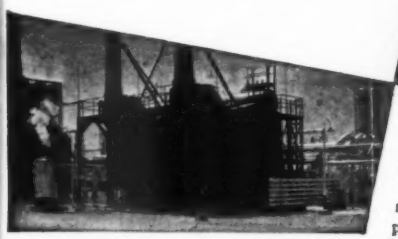
12. **GUEST.**—Discovered by DeSoto Oil Co. 1 J. C. Guest in January 1951. This well, located in Section 91, Block D, H&TC, was completed for an initial production of 142 bbl. of oil flowing from Canyon sand

WICKES

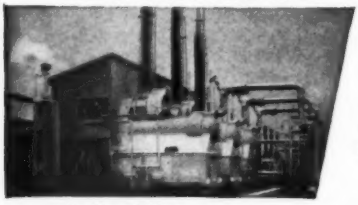
STEAM GENERATORS SPEED PROCESSING AND CUT COSTS IN REFINERIES AND NATURAL GASOLINE PLANTS



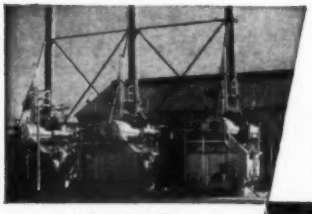
West Texas Natural Gasoline Plant



Central Texas Natural Gasoline Plant



Louisiana Refinery



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at plugged-back total depth of 4,560 ft. At present there are five producing wells covering 200 acres, and the limits are undefined.

13. **EAST OLD GLORY.**—Field discovered by Cities Service Oil Co. 1 H. Baitz in March 1951. This well, located in Section 27, BBB&C, was completed for an initial production of 24 bbl. of oil pumping from Bend conglomerate at total depth of 6,130 ft. This is a one-well field and no further development has occurred since discovery.

14. **FLAT TOP STRAWN.**—Discovered by Cities Service Oil Co. 1-161 Flat Top in March 1951. This well, located in Section 161, Block 1, BBB&C, was completed for an initial production of 35 bbl. of oil pumping from Strawn sand at plugged-back depth of 5,310 ft. This is also a one-well field.

15. **ASPERMONT LAKE.**—Discovered by DeSoto Oil Co. 1 V. B. Bullard in May 1951. This well, located in Section 129, Block D, H&TC, was completed for an initial production of 419 bbl. of oil flowing from Canyon sand at plugged-back total depth of 4,978 ft.

In November 1951, Continental Oil Co. 1-A F. E. Scoggins was completed as the discovery well for a deeper pay. This well, located in Section 124, Block D, H&TC, was completed for an initial production of 440 bbl. of oil in 5 hours flowing from Canyon reef limestone at total depth of 4,926 ft.

As of December 1, 1951, there were four producing wells covering 160 acres, and the field limits are undefined.

16. **UPSHAW.**—Discovery was C. L. Norsworthy, Jr., 1 T. A. Upshaw completed in May 1951. This well, located in Section 84, Block D, H&TC, was completed for an initial production of 256 bbl. of oil flowing from Pennsylvanian - Caddo limestone at plugged-back total depth of 6,076 ft.

On December 4, 1951, Seaboard 1 T. A. Upshaw was completed as the discovery well for a shallower pay. This well, located in Section 61, Block D, H&TC, was completed for an initial production of 117 bbl. of oil in 16 hours flowing from Canyon reef limestone at total depth of 4,824 ft.

At present there are three producing wells covering 120 acres and the limits are undefined.

17. **UNNAMED.**—Discovery well for this unnamed field was McAlester Fuel Co. 1 Ella Bunnell completed in June 1951. This well, located in Thomas Constable Survey, was completed for an initial production of 35 bbl. of oil pumping from Bend conglomerate at total depth of 6,075 ft. At present this is a one-well field and the limits are undefined.

18. **FLAT TOP SWASTIKA.**—Discovery was Cities Service 1-140 Flat Top, completed in June 1951. This well, located in Section 140, Block 1, BBB&C, was completed for an initial production of 124 bbl. of oil flowing from Pennsylvanian - Cisco Swastika sand at total depth of 3,405 ft. At present this is also a one-well field and the limits are semidefined.

19. **SOUTH FLAT TOP.**—Discovery well was Oxford Drilling Co. et al 2 J. W. Hines, completed in June 1951. This well, located in Section 171, Block 1, BBB&C, was completed for an initial production of 82 bbl. of oil in 3 hours flowing from Permian upper Tannehill sand at total depth of 2,687 ft. At present the field has six producing wells covering approximately 60 acres and the limits are semidefined.

20. **BOYD CONGLOMERATE.**—Discovery was Edgar Davis Drilling Co. (formerly Dan Auld) 1 C. E. Boyd, completed in October 1951. This well, located in Section 45, Block D, H&TC, was completed for an initial production of 427 bbl. of oil flowing from Bend conglomerate at total depth of 6,050 ft. As of December 1, 1951, this was a one-well field, but additional development is now in progress and the limits are undefined.

Future development will probably reveal that this well is a 2-mile northeast extension of Upshaw field, but producing from a separate deeper pay horizon. If this is the case, then Upshaw field will be a reservoir producing from three separate pay horizons namely: Canyon reef, Caddo limestone, and Bend conglomerate. The linking of these two fields would develop into a field having an areal extent of approximately 1½ miles wide by 3 miles long.

21. **UNNAMED.**—Moutray-Moore Drilling Co. (formerly W. F. Nenney) 1 O. M. Sparks is a very recent discovery well and the field has not been officially named. This well, located in Section 161, Block 1, H&TC, was completed on December 4, 1951, for an initial production of 126 bbl. of oil in 10½ hours flowing from Canyon reef limestone at total depth of 5,288 ft. This well is located 1½ miles northeast of Double Mountain field which also produces from Canyon reef limestone, but is separated from this field by dry holes.

Conclusion

In conclusion, I would like to point out that of the 21 fields so far discovered 3 have been completely defined, 5 semidefined, and 13 are undefined. With this number of fields having their limits undefined the future for oil development in Stonewall County is very bright. Barring shortages in tubular goods for the coming year, I predict by the close of 1952, Stonewall County will have increased its production to such an extent that it will be one of major producing counties of West Central Texas.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Stripping With Gas In Catalytic Unit

When using flue gas rather than steam to strip oil from spent catalyst, how much flue gas is required, does oxygen or carbon monoxide have any effect on the cracking reaction, and does the elimination of water from the catalyst cause the efficiency to decrease?—R.C.R.

Although flue gas was discussed as a stripping agent in the early development of catalytic cracking processes, it is believed that it has not been employed to any extent in regular commercial operations.

A major disadvantage in the use of flue gas as a stripping agent is the fact that it becomes associated with the gaseous products of the process whereas steam can be removed by condensing it. Thus, flue gas passes through the compressors, through the absorbers or high-pressure fractionators, increasing the cost of handling the gas at all points. This disadvantage can be forcefully illustrated by consideration of conventional natural-gasoline-plant absorber and stripper. If flue gas is used to strip the rich oil, the valuable gasoline (and butane) hydrocarbons issue from the stripper as an admixture with flue gas and they cannot easily be condensed to a liquid because of the partial pressure effect of the fixed or inert flue gases. In effect, the recovered gasoline hydrocarbons are no more available after passage through the plant than they were in the field gas because in both instances they are associated with fixed gases (methane, etc. in the field gas and flue gas after stripping).

The extra cost of eliminating fixed gases in the recovery system as against the cost of removing steam is significant and, of course, the flue gases would have to be generated, perhaps cooled and blown through the catalyst. All of these costs would have to be lower than the cost of generating steam. However, the relatively high cost of steam is an encouragement to the use of flue gas. In a 5,000-bbl. per day plant, the steam required for stripping may be 50,000 lb. per hour and the yearly cost of such an amount of steam might exceed $90,000.

Theoretically, stripping is a molecular process and hence the same number of mols of flue gas (about 30 lb. per mol) as mols of steam (18 lb. per mol) is required. However, the mechanical effectiveness of flue gas may differ from that of steam.

The situation with respect to the effect of nitrogen, carbon monoxide, or oxygen on the catalytic cracking reaction is not entirely clear although in at least one plant severe corrosion by the formation of ammonia has been reported. In the plant that suffered corrosion, the appearance of ammonia in the gas-recovery system was blamed on traces of nitrogen that remained on the regenerated catalyst as it left the regenerator. Steam was used for stripping. The ammonial vigorously attacked the copper-base alloys of the recovery-system condensers and coolers. It is quite probable that carbon monoxide and oxygen would also lead to traces of strange or deleterious catalysis products.

Degree of hydration of the catalyst is probably not significant because the stripped catalyst passes next to the regenerator of the process, not the reactor. The presence or absence of adsorbed moisture on the surface of the catalyst would pobably not affect the efficiency of the burning operation.

Cost of Platformer Units

What is the cost of Platforming units and what does it cost to operate them? F. M.

The best place to get cost information is from the many contractors that are now building such plants or from the licensor (Universal Oil Products Co.). However, some costs are at hand and some are available in the literature.[1-4] These plant costs were converted to 1946 costs by the Nelson Refinery Construction Index[5] so that they could be compared as shown in Fig. 1. Approximate 1952 plant costs are also shown on Fig. 1 using an increase in cost of 60 per cent since 1946.

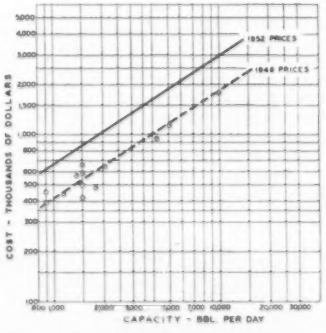


Fig. 1—Approximate costs of Platforming units in 1946 and 1952.

A few large plants are being built at much larger cost than those shown here (Shell Oil Co. and Standard Oil Co. of California),[6] and, of course, the plants that are to produce and purify benzene and toluene are more expensive.

Little, with respect to the operating costs, has been published but Haensel[1] suggests for 1950:

	Cents per bbl.
Operator and part-time helper	4-5
Maintenance	3-5
Taxes and insurance	4-5
Utilities	4-5
Catalyst	under 10
Royalty (escalator)	7
Total	30-37

No fuel is included because the process produces enough fuel to supply all of the heat required.

References

1. Haensel, V.—The Oil and Gas Journal, March 30, 1950, p. 82.
2. Author's private files.
3. Anon.—Pet. Engineer, Aug. 1951, p. C-51.
4. Anon.—Refinery and Other Plant Construction, Pet. Refiner, Jan. 1952, p. 97.
5. On the Refining page of The Oil and Gas Journal in the first weekly issue each month.

Meaning of Total Process Equipment Cost

In your Cost-imating Series you frequently use the term "Total Process Equipment Cost," and particularly in No. 34 (June 9, 1949) which pertains to instrument costs. What does this mean? G. C. G.

The term "Total Process Equipment Cost" refers to the cost of both material and labor. The word "Equipment" is used to distinguish between the part of the plant that pertains directly to processing as against such parts as utilities or their service lines, storage, buildings other than process buildings, land, royalties, shops, inventories, operating capital, fire-fighting equipment, railroad or other loading facilities, etc.

CORROSION and its control

Passivators and Inhibitors

ONE of the basic approaches to a corrosion problem is the modification of the environment so as to render it less aggressive toward the structure under attack. The "internal environment" to which process equipment is exposed, that is, the process fluids themselves, is subject to such modification in many instances, without materially affecting the ultimate results of the process. In general, the process stream may be modified in three ways: (1) by an actual change in the process, such as performing some operation at a lower temperature, changing the order of operations, or even by basically revising the process; (2) by inserting a piece of apparatus whose function is to remove some component which is responsible for corrosion, and which can be removed without seriously affecting the process; or (3) by adding quantities of a substance whose presence will affect the aggressiveness of the fluid stream.

Three Categories of Substances

Substances which are added fall into three categories, between which there is much overlapping: (1) direct chemical control—total or partial neutralization of acid or alkaline substances, precipitation of aggressive ions, or supplying ions to satisfy the "appetite" of aggressive ions; (2) passivators; and (3) inhibitors. The distinction between passivators and inhibitors on the one hand, and substances which function by direct chemical control is partly functional and partly quantitative. There is a tendency to use the term inhibitor in referring to a substance whose presence in small quantities reduces or eliminates corrosive attack. When this reduction takes place in a certain way, it is usually referred to as a passivator.

Both inhibition and passivation are phenomena associated with the surface of the metal under consideration; direct chemical control is associated with the bulk of the corrosive fluid. As usually defined, passivation is characterized by a change in the electrochemical behavior of the metal, in that it acts as a more noble metal than when in its normal or "active" state. This difference is subject to measurement in electrical terms; the difference between "active" and "passive" areas on 18-8 stainless steel has been measured as 0.5 to 0.6 volt.[1] This characteristic of assuming two different electrochemical behaviors makes metals of this type subject to severe pitting attack in some environments. The chloride ion is a particularly bad offender in this regard; the corrosion products formed within any small anodic area will automatically maintain the metal there in an active state, and thus an accelerated attack takes place within a very small region. Pitting of stainless steels and of nickel alloys is far more likely to occur in acid solutions than in alkaline; for strongly alkaline solutions, the total metal loss may be increased (as compared to neutral conditions) but the penetration rate may be greatly decreased.

Several theories of passivity have been proposed; all agree that there is at the surface of the passive metal some kind of film; of metal oxide, of adsorbed oxygen, of oxygen or other ions bound by valence bonds to the metal, or of atoms of the constituent metals (in passive alloys) bound together and thus leaving no open bonds for combination with ions from the solution. The common factor to all of these theories is some kind of film—and it is distinguished from certain other films which may confer protection from corrosion by being a thin film, of essentially molecular or atomic dimensions.

Action of Inhibitors

Inhibition, on the other hand, is ordinarily associated with films of somewhat greater thickness; films thick enough to offer an actual obstacle to the physical penetration of the potentially damaging ions. Inhibition is at the same time a more general process than passivation; more difficult to define, because not characterized by any easily recognizable property similar to the potential change already referred to. In fact, it might well be defined as failure of a metal to corrode in a corrosive situation. In other words, the specific inhibitive agent added to the corrosive environment does not produce much change in the fluid itself, except at the metal surface.

The action of inhibitors may be classified (but not quite completely) as anodic or cathodic. An anodic inhibitor is one which produces a reaction at the anode, different from the reaction which would ordinarily be expected there, and tending to stifle the action at that point. A cathodic inhibitor acts in just the same way, except that it is the cathode which is affected. Cathodic inhibitors are not in general so effective as the anodic variety, because cathodic areas are usually much larger. On the other hand, their use is not accompanied by the danger of actually intensifying the attack—which may easily happen with an anodic inhibitor, if the concentration is not sufficient, or if there are crevices and corners where the local concentration can be too low.

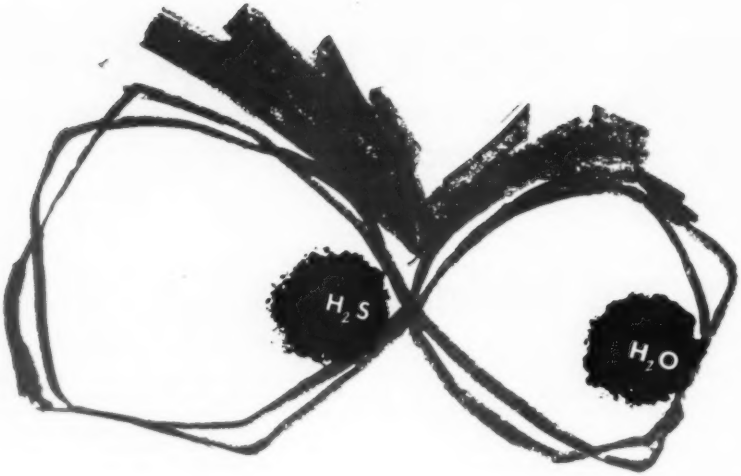
Typical Anodic Inhibitors

Phosphates, chromates, and silicates are typical anodic inhibitors; carbonates and bicarbonates function (in water) as cathodic inhibitors, as are salts of less noble metals than the one under attack. The action of the many organic inhibitors is often obscure, but it seems probable that they act primarily on cathodic areas. It is a fortunate circumstance, insofar as corrosion of steel refinery equipment is concerned, that many of substances present in crude oils, and many of the decomposition products of distribution and cracking processes are organic inhibitors—for it is true that the actual corrosion rates obtained in most vessels handling streams with water content is far lower than would be expected from the aggressive ions present in the water.

Reference

1. Corrosion Handbook, H. H. Uhlig, John Wiley & Sons, p. 165.

Part 45 of a series by Marshall E. Parker, consulting engineer, Houston.



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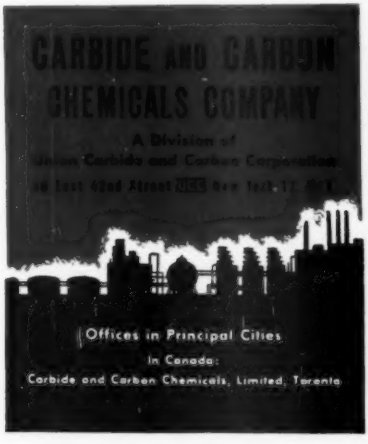
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Water-Cooling Towers and Air-Cooled Heat Exchangers

by Howard E. Degler*

IN the mechanical-draft tower water drops through upward-moving air circulated by fans and falls into the cold-water collecting basin (Fig. 1). As the water falls from level to level over the wood filling (Fig. 2) it splashes into fine droplets and spreads out over the wood slats in thin films, thus providing additional water surface to the upward moving air.

Air-cooled heat exchangers.—In the so-called "dry-surface cooler" (noncontact convection-type heat exchanger) the fluid flowing through finned-tube sections is cooled by fan-circulated air. This type of exchanger is not common in refineries but is having increased acceptance in field processing plants (natural gasoline, etc.) and may be specified for refineries where water is scarce or unsuitable for cooling or where small compact units are desired. The air-cooled exchangers are easy to start and easier to operate in cold weather. Their usage is for "high-level" heat removal (e.g., above 130° F. referred to 100° F. dry-bulb air).

The water-cooling tower would generally be used in preference to the dry-cooling unit when cold-water temperatures are less than 130° F. and which could approach (within a few degrees) the wet-bulb temperature of the air, e.g., 85° F. cold water to an 80° F. wet bulb.

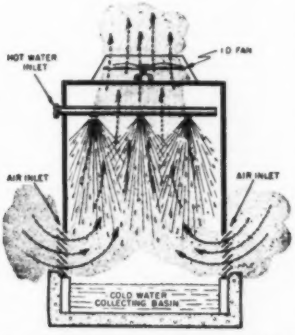

Fig. 1—Basic elements of a spray-filled counterflow water-cooling tower.

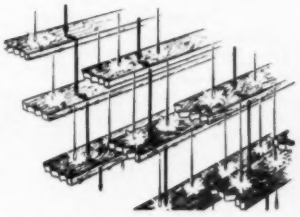

Fig. 2—Wood fill in towers provides more cooling surface and water breakup.

Normally the cooling tower is more economical, but the cost of the dry cooler decreases relative to that of the tower as the temperature of the fluid to be cooled rises. Both units have their own applications but in some instances either type may be used. A careful evaluation of both methods should be made to insure that the most suitable cooling equipment is selected in each case. *(See The Oil and Gas Journal, September 6, 1951, page 76.)*

Design temperatures.—When selecting the design air temperature for dry-surface coolers, it is generally acceptable to choose a **dry-bulb** temperature which will not be exceeded more than 5 per cent of the hours between noon and midnight during the months of June to September, inclusive. (Consult local U. S. Weather Bureau Statistics or "Summer Weather Data" by J. C. Albright, published by Marley Co., Kansas City.) The temperatures that occur in excess of this design value will be of such short duration that they will not affect appreciably the efficiency or performance. Generally used dry-bulb design temperatures are 95° to 110° F.

For the air-cooled exchanger, **cooling range** is the number of degrees that the fluid is cooled in the exchanger. **Approach** is the difference between the temperature of the cold fluid leaving the dry cooler and the dry-bulb temperature of the ambient air.

In the water-cooling tower **cooling range** is temperature difference between hotter water entering the tower and cooler water leaving the tower. **Approach** is the difference between cooled water leaving tower and the wet-bulb temperature of the ambient air. If a closer "approach" is desired, larger equipment must be used. Wet-bulb design temperatures of 70° to 80° F. are ordinarily used.

Makeup and blowdown.—Evaporation and drift loss and blowdown determine the amount of makeup water required in cooling-tower operation. Average evaporation losses will run from 0.75 to 1.0 per cent of the water circulated for each 10° F. cooling range. Drift loss may run at about 0.1 per cent of the water circulated. Hardness of circulating water, treatment employed, and amount of drift loss determine amount of blowdown. The ratio of makeup to blowdown indicates the number of concentrations in the system since amount of solids introduced by makeup water equals total removed by blowdown. (See nomogram in No. 108, Refiner's Notebook.)

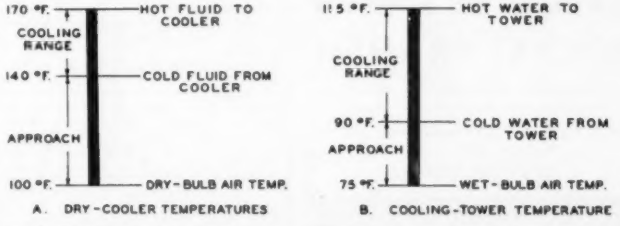

Fig. 3—Definition of "Cooling Range" and "Approach" for air-cooled heat exchangers and water-cooling towers. (Temperatures illustrative only, subject to variation.)

*Technical director, Marley Co. From paper presented at A.S.M.E. petroleum mechanical engineering conference, Tulsa.

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Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. This list is compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

Continental Pipe Line Co.—105 miles, 8-in., authorized, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Completion date 1952.

Continental Pipe Line Co.—217 miles, 12-in., authorized, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1952.

Interstate Oil Pipe Line Co.—33 miles, 20-in., authorized, Bunkie to Melville, La. Completion date 10-52.

68 miles, 16-in., authorized, Raceland to Anchorage, La. Completion date 10-52.

18 miles, 12-in., authorized, LaRose to Raceland, La. Completion date 10-52.

47 miles, 16-in., authorized, Sunset to Anchorage, La. Completion date 7-52.

Mid-Continent Pipe Line Co.—23 miles, 4-2-in., under way, Elmore City to Velma, Okla. C. P. Carter Const. Co. Gus Bowman, spreadman at Duncan, Okla. Completion date 3-1-52.

Ohio Oil Co.—117 miles, 22-in., under way, Sheridan, Ind., to Lima, Ohio. R. A. Conyes, contractor.

Pan American Pipe Line Co.—27 miles, 26-in., Genoa to Texas City, Tex. Completion date 12-52.

Pan American Pipe Line Co.—40 miles, 14-in., Arden Station in Irion County to Eldorado Station in Schleicher County. 6-52.

Platte Pipe Line Co.—1,075 miles, 16-20-in., under way, Worland, Wyo., to Wood River, Ill. Completion date 1952.

Platte Pipe Line Co.—573 miles, 16-20-in., under way. Winchester, Wyo., to Brule, Neb. R. H. Fulton & Co. (Sections 1, 2, 3, and 4.—Section 1, 126 miles of 16-in., remainder 20-in.) A. A. Carrigan, spreadman at Wheatland, Wyo., field office.

Platte Pipe Line Co.—142 miles, 20-in., contracted, near Marysville, Kans., to Holdredge, Neb. Bishop & Lock (Section 5); H. LaQuey, spreadman.

Platte Pipe Line Co.—100 miles, 20-in., contracted, northern edge of Kansas. Rumsey Bros., contractor of Section 6.

Platte Pipe Line Co.—(Section 7). 274 miles, 20-in., Missouri River to Salisbury, Mo., and (Section 8) Salisbury to Mississippi River, under way. O. R. Burden Construction Co., field office, Mexico, Mo.; B. C. Hall, spreadman; river crossing field office, Hartford, Ill., Dick Jernigan, spreadman.

Progress Pacific Pipe Line Co.—900 miles, 20-in., proposed, Permian basin, West Texas, to California.

Rancho Pipe Line System.—455 miles, 24-in., authorized, McCamey to Houston, Tex. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co., with Shell Pipe Line Corp. handling construction and operation.

Roosevelt Oil & Refining Corp.—22 miles, 4 and 6-in., authorized, St. Helens to Norwich, Mich.

Service Pipe Line Co.—28 miles, 20-in., looping, authorized; Drumright, Okla., to Humboldt, Kans. G. G. Griffis Const. Co., contractor. E. G. Grisham, spreadman at Drumright.

Shell Pipe Line Co.—42 miles, 8-in., authorized, Hallettsville to LaGrange, Tex. Completion date 7-1-52.

Shell Pipe Line Corp.—66 miles, 8-in., authorized, Gohlke to La Grange, Tex. Company crews. Completion date 1952.

Sinclair Pipe Line Co.—674 miles, 22-24-in., authorized; Drumright, Okla., to E. Chicago, Ind. Completion date 1952. (Section 1).—150 miles, 24-in., contracted, Drumright-Cushing, Okla., area, to Humboldt, Kans. O. R. Burden Construction.

Skelly Oil Co.—38 miles, 8-in., under way, Lyons to Burrton, Kans. Rumsey Bros., contractor. Completion date 1-53.

Texas Pipe Line Co.—319 miles, 22, 12, 10-in., Louisiana Gulf Coast to Port Arthur, Tex., including 220 miles, 22-in., Houma, La., to Port Arthur, Tex.; 31 miles, 12¾-in., Houma to Cocodrie, La. Houston Contracting Corp. Completion date in summer 1953.

Toronto Pipe Line Co., Shell Pipe Line Corp., and Texas Pipe Line Co.—52 miles, 12-in., 10 to 12 miles, 10-in., 10 miles, 6-in., planned, Sterling, Colo., to connection with Platte Pipe Line at Gurley, Neb.

West Texas Gulf Pipe Line Co.—471 miles, 26-in., contracted, Colorado City to Wortham, Tex., 26-in.; Wortham to Sour Lake—Tex., 24-in. Completion date 10-52.

West Texas Gulf Pipe Line Co.—114 miles, 20-in., contracted, Wortham to Longview, Tex Completion date 10-52.

West Texas Gulf Pipe Line Co.—44 miles, 26-in., under way, Glenrose, Tex., area. Anderson Brothers, contractor.

Products Pipe Lines

Bell Oil & Gas Co.—150 miles, 6-in., planned, Ardmore to Drumright, Okla. (Includes 114 miles, 8-in.; 32 miles, 6-in.)

Buckeye Pipe Line Co.—370 miles, 8, 12, 16-in., authorized, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. (Sections divided as follows: 75 miles, 16-in., 218 miles, 12-in., 77 miles, 8-in.) Start 1952, completion of 16-in., 1952, balance 1953.

Ohio Oil Co.—24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

Phillips Oil Co.—28 miles, 12-in., authorized, Sweeny to Freeport, Tex. Completion date 3-52.

Phillips Pipe Line Co.—42 miles, 10-in., under way, Green Ridge to Villa Ridge, Mo. Mid-States Const. Co. T. H. Edmonds, superintendent at Sedalia, Mo.

34 miles, 8-in., under way, Kanakee, Ill., to Dyer, Ind. Somerville Const. Co. O. P. Hiner, spreadman at Kankakee. Completion date 3-15-52.

Phillips Pipe Line Co.—68 miles, 12¾-in., under way, Osawatomie westward to Wichita, Kans. Brown Lite Co. R. E. Carriker, spreadman at Osawatomie, Kans.

40 miles, 10-in., through Monteau, Cole, Osage, and Gasconade counties, Missouri, Trojan Const. Co. E. L. Maggard, spreadman at Linn, Mo.

Under way, Paola, Kans. - Harrisonville, Mo., Smith Contracting Corp.

74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const. Co., contractor.

137 miles, 10-in., authorized, looping from Paola, Kans., to East St. Louis, Ill.

Progress Pacific Pipe Line Co.—900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—Proposed, Pasco, Wash., to Puget Sound.

Shell Oil Co.—565 miles, 8-14-in., planned, Wood River via East Chicago to Detroit; 35 miles, 14-in. Completion date summer of 1952.

Sinclair Pipe Line Co.—8-in., proposed, Sinclair, Wyo., to Salt Lake City, Utah; 10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in. Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

Socony-Vacuum Oil Co., Inc.—175 miles, 6-8-in., under way, Augusta, Kans., to Kansas City, Mo. Ray L. Smith & Son, Inc. (Spreadmen are located as follows: Dewey Whitworth at Topeka, Kans.; Carl Samuel Colvin at Burlingame, Kans.; George Kelpar at Topeka, Kans.; Clark Liggett, Tonganoxie, Kans.) Completion date 1-1-52.

Standard Oil Co. (Ind.).—122 miles, 8-in., under way, Neodesha, Kans., to Belton, Mo. Bills & Troth Construction Co., Carl Bills,

superintendent, at Armory Building, Neodesha. Completion date 1952.

Standard Oil Co. (Ohio).—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

United States Pipe Line Co.—1,000 miles, proposed, Gulf Coast via Memphis, Nashville, Tenn., Lexington, and Paducah, Ky., to Cincinnati, Ohio.

Natural-Gas Pipe Lines

Allied Gas Co.—34 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

Amere Gas Utilities Co.—16 miles, 8⅝-in., proposed, loops from Mercer County to Princeton, W. Va.

Amere Gas Utilities Co.—15 miles, 8⅝-in., proposed, near Dameron to Flat Top, W. Va.

Associated Natural Gas Co.—88 miles, authorized, Missouri.

Carolina Natural Gas Corp.—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Cities Service Gas Co.—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Const. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

21 miles, 26-in., proposed, Franklin and Anderson counties, Kansas.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

Coast Counties Gas & Electric Co.—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash, spreadman at Lamar, Colo.

16 miles, 4-in., Pueblo County to Fowler, Colo.

Commonwealth Natural Gas Corp.—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Cumberland and Allegheny Gas Co.—46 miles, 10-in., authorized, Mountain Lake Park, Md., to Preston County, W. Va.

Dow Chemical Co.—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich.; Mahoney Contracting Co., contractor, Ralph Bucher, spreadman at Midland.

East Tennessee Natural Gas Co.—172 miles, 22-in., authorized, Greenbrier to Oak Ridge, Tenn.

East Tennessee Natural Gas Co.—100 miles, 16-in., proposed, Knoxville to Kingsport, Tenn.

El Paso Natural Gas Co.—122.9 miles, 30-in. proposed, looping along main line in Texas, New Mexico, Arizona.

Equitable Gas Co.—17 miles, 16-in., under way, near Pittsburgh. H. L. Gentry Const. Co., contractor. Lavern Curtis, spreadman at Sewickley, Pa.

Georgia Gas Co.—32 miles, 4½-in., proposed, Bogart to Gainesville, Ga.

Glacier Gas Co.—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

Glacier Gas Co.—120 miles, 16-in., proposed, Spokane to Hanford, Wash.

Glacier Gas Co.—91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

Glacier Gas Co.—130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Grand Valley Pipe Line Co.—105 miles, 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

Gulf Michigan Transmission Corp.—680 miles, 30-in., proposed, Perryville, La., across Arkansas, Missouri, and Illinois to terminus near St. John, Ind.

Home Gas Co.—17 miles, 12-in., proposed, loops from Hancock to Sanford, N. Y.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., authorized, Washington County to Cedar Rapids, Iowa.

¾ to 6-in., under way, Davenport, Iowa, and Moline, Ill. C. E. Wilson Const. Co.

Kansas-Nebraska Natural Gas Co., Inc.—179 miles, proposed, Kansas and Nebraska.

40 miles, 6-in., under way. Albion to Norfork, Neb. Jayhawk Const. Co., Inc., contractor; F. A. Faler, spreadman at Albion.

30 miles, 6-in., under way, Albion to Neligh, Neb. Jayhawk Const. Co., Inc., F. A. Faler, spreadman at Albion.

60 miles, 8-10-12-in., under way, Grand Island to Albion, Neb.

65 miles, 2-8-in., authorized, Big Springs field to Ogallala, Neb., and to Ovid, Colo.

39 miles, 4 and 6-in., planned, Neligh to O'Neill, Neb., 54 miles, 4 and 6-in. planned, Neligh to Hartington, Neb. (extension). Completion date 1952.

Kansas Power & Light Co.—27 miles, 20-in., authorized, Pratt, Kans., to Calista compressor station.

Lake Shore Pipe Line Co.—45 miles, 10¾-in., authorized, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio.

Michigan Gas Storage Co.—93 miles, 16-22-24-in., under way, Laingsburg to near Pontiac and Mount Clemens, Mich. (Includes 17 miles of lateral lines.) Mahoney Contractor. Completion date 6-52.

Michigan Gas Storage Co.—30 miles, 26-in., authorized, looping between Laingsburg and Mount Pleasant Junction, Mich.

Michigan Gas Utilities Co.—77 miles under way, Sturgis, Hillsdale, and Coldwater, Mich. (22.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis; 11 miles, Hillsdale to Jonesville.) Somerville Const., contractor. Jim Godwin at Coldwater.

MidSouth Gas Co.—240 miles, proposed, Greene, Poinsett, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

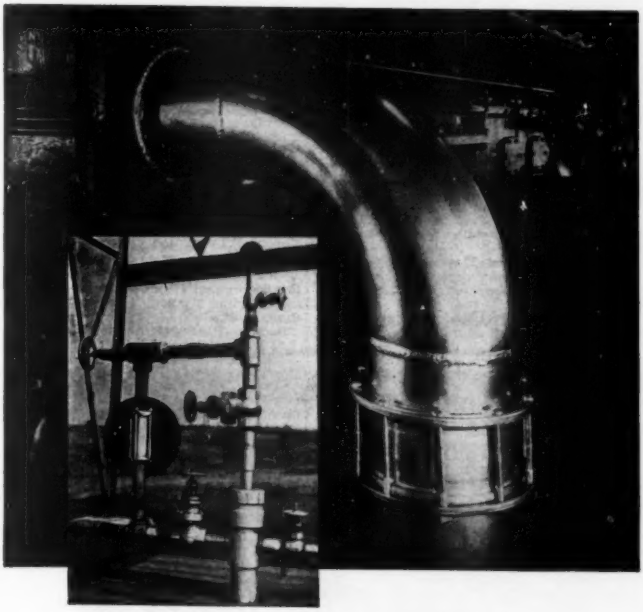
Mississippi River Fuel Corp.—98 miles, 16- and 18-in., authorized, feeder line from Lincoln Parish, Louisiana, to Waskom field, Harrison County, Texas.

Mississippi River Fuel Corp.—40 miles, 18-in., authorized, Dubach to Perryville, La.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

Montana Power Co.—52 miles, 16-in., authorized, Canada-Montana border to Cut Bank, Mont.

National Utilities Co. of Michigan.—78.7



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miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east to Hillsdale; 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 6 miles west to Union City.)

New River Gas Co.—50 miles, planned, Summers or Monroe counties, West Virginia to Narrows and Dublin, W. Va.

New York State Natural Gas Corp.—66 miles, 20-in., proposed, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in. in Potter County, Pennsylvania, and 21 miles 14 in., replacement in Line No. 507, New York.)

Niagara Mohawk Power Corp.—55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor, Howard Bauer, supt. Completion date 9-52.

Northeastern Gas Transmission Co.—221 miles, 20-24-in., authorized, New Hampshire, Massachusetts, and Connecticut.

Northeastern Gas Co.—411 miles, proposed, New England towns.

Northern Natural Gas Co.—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

Northern Natural Gas Co.—370 miles, 4-26-in., authorized, gathering lines in Hugoton field.

Northern Natural Gas Co.—210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

Northern Natural Gas Co.—181 miles, 4-12-in., contracted, gathering system in Hugoton area. Reese Bros. Const., contractor. Completion date in spring.

Northern Indiana Fuel & Light Co.—33 in., authorized, Perryville Station, La., to Boeuf River.

Northwest Natural Gas Co.—750 miles, planned, Washington, Oregon, and Idaho.

373 miles, 24-in., proposed, Eastport, Idaho, to Monroe, Wash.

79 miles, 18-in., proposed, Monroe to International boundary near Lynden, Wash.

29 miles, 22-in., proposed, Monroe to near Seattle, Wash.

164 miles, 20-in., proposed, Seattle to Portland, Ore.

Ohio Fuel Gas Co.—31 miles, 20-in., proposed, Licking County to Richland County, Ohio.

25 miles, 20-in., under way, Xenia, Ohio. Sheehan Pipe Line Const. Co. Earl Williams, spreadman at Xenia. Completion date 2-1-52.

22 miles, 16-in., authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., authorized, Wellington to Elyria, Ohio; 16 miles, 20-in. authorized, Benton Station to Crawford Station. Completion date 11-15-51. 18 miles, 20-in., Crawford Station to near Columbus. Completion date 12-31-51. 16 miles, 16-in., authorized, Berlin to Sandusky, Ohio. Completion date 12-31-51.

74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, authorized northern and southwestern Ohio.

Oklahoma Natural Gas Co.—14 miles, 8⅝-in., under way, Shamrock to Cushing, Okla.; 21 miles, 24-in., under way, Depew to Kellyville, Okla. Completion date 1-15-52. 9 miles, 12¾-in., Stroud to Depew, Okla. 26 miles, 12-in., under way, Ringwood to Enid, Okla. Completion date 3-15-52.

Pacific Gas & Electric Co.—44 miles, 8-in., under way, Salinas to King City, Calif. W. A. Tyler, contractor. Completion date 1952.

Pacific Gas & Electric Co.—141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

Pacific Gas & Electric Co.—10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

Pacific Northwest Pipe Line Co.—400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

Pacific Northwest Gas Pipe Line Corp.—1,175 miles, planned, Wharton County, Texas, via Oklahoma, Kansas, Fort Collins, Colo., to Portland, Ore., Tacoma and Seattle, Wash.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

Panhandle Eastern Pipe Line Co.—174 miles, 30 and 26-in., contracted, Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor. 44 miles, 26-in., Edgerton, Mich.; Anderson Bros.; 22 miles, 30-in., looping in Tuscola, Ill.; 45 miles, 30-in., looping in Montezuma, Ind.; 63 miles, 30-in., looping in Zionsville, Ind.

Pennsylvania Gas Co.—52 miles, 12-in., between Warren and Erie, Pa. (Section 1—27 miles, under way and contracted by Harford Bros. Section 2—25 miles.

Peoples Natural Gas Co.—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

Phillips Petroleum Co.—118 miles, 3-22-in., under way, Sherman and Hansford counties, Texas, gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex., J. F. Crawford, spreadman at Texhoma, Okla.

Prince George's Gas Corp.—20 miles, 22-in., authorized, between Chillum and Rockville, Md.

Public Service Co. of North Carolina.—33 miles, 10-in., authorized, Burlington to Chapel Hill, N. C., completion date 3-1-52; 16 miles, 8-in., authorized, Chapel Hill to Raleigh, N. C., completion date 7-1-52; 29 miles, 4-in., authorized, Statesville to Kanapolis, N. C., completion date 7-1-52; 83 miles, 8-in., authorized, Kings Mountain to Asheville, N. C., completion date 3-1-53.

Rockland Light & Power Co.—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

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Southern California Gas Co.—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and Southern Counties Gas Co. of Calif.—45 miles, 30-in., proposed, looping on line from Arizona border to Los Angeles.

Southern California Gas Co. and Southern Counties Gas Co. of California.—81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

Southern Natural Gas Co.—21 miles, 24-miles, 8-in., proposed, Edgerton to Auburn, Ind.

Southern Natural Gas Co.—14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

Southern Natural Gas Co.—14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

Southern Natural Gas Co.—375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

Southern Natural Gas Co.—169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish, 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi; and 108 miles, 14-in., Bass Junction to Augusta, Ga.

Southern Union Gas Co.—21 miles, 20-in., authorized, Albuquerque, N. M.

27 miles, 10-in., authorized, Lea and Eddy counties, New Mexico.

30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

Southwest Gas Corp., Ltd.—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

Sunray Oil Corp.—133 miles, 3-30-in., under way, system for Snyder gasoline plant. Vaughn & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

Tennessee Gas Transmission Co.—591 miles, 24-30-in., proposed, looping along present system (consisting of 323 miles of 30-in.; 167 miles of 26-in.; 101 miles of 24-in.)

420 miles, 30-in., Texas, La., Ark., Miss., Tennessee, and Kentucky.

101 miles, 26-in., Kentucky and Ohio.

304 miles, 24-in., proposed, Mercer, Pa., to Utica, N. Y.

250 miles, miscellaneous laterals.

Texas Eastern Transmission Corp.—791 miles, 30-in., under way, Kosciusko, Miss., to Connellsville, Pa.

(Section 1 and 2) 163 miles, 30-in., under way, Kosciusko, Miss., to Florence, Ala. Williams Bros.-Davis Co.

(Section 3) 76 miles, 30-in., Florence, Ala., to Columbia, Tenn. Eastern Pipe Line Contractors.

(Section 4) 73 miles, 30-in., under way, Columbia, Tenn., to Cumberland River. H. B. Zachry Co. A. Vaughn superintendent at Lebanon, Tenn. Completion date 12-10-51.

(Section 5) 79 miles, 30-in., under way, Cumberland River to Columbia, Ky. Oman Const. Co. William Smith, superintendent and Floyd Hudnell, spreadman at Columbia, Ky.

(Section 6) 82 miles, 30-in., under way, Columbia, Ky., to Boonesboro, Ky. N. A. Saigh Co.

(Section 7) 100 miles, 30-in., under way, Kentucky River to Ohio River, northeastern Kentucky. Mahoney Const. Co.

(Section 8) 77 miles, 30-in., under way, Portsmouth to Amesville, Ohio. Anderson Bros. Corp.

(Section 9) 74 miles, 30-in., under way, Amesville to Ohio-West Virginia river crossing. Anderson Bros. Corp.

(Section 10) 66 miles, 30-in., under way, Ohio River to Connellsville, Pa. Anderson Bros. Corp.

Texas Eastern Transmission Corp.—50 miles, 30-in., under way, Ohio River to Vanceburg, Ky. Trojan Construction Co., Inc., contractor. Charles Tillotson, spreadman at Morehead, Ky.

Texas Gas Transmission Corp.—35 miles, 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

Texas Gas Transmission Corp.—189 miles, 26-in., authorized, Acadia Parish to connection with existing facilities in Morehouse Parish.

Texas Gas Transmission Corp.—195 miles, 26-in., proposed, Gulf Coast region to southwestern Louisiana.

Texas Gas Transmission Corp.—425 miles, 26-in., authorized, looping from Bastrop, La., to Hardinsburg, Ky.

Texas Gas Transmission Corp.—181 miles, 26-in., under way, Bastrop to Eunice, La., Houston Contracting Co. (North spread near Beekman, 65 miles south to Grayson, La., W. H. Hayes, supt.; center spread, north side of Red River at Pineville, 60 miles north to Grayson, E. C. Norris, supt.; south spread, south side of Red River, 56 miles south to Tepetate field near Eunice, F. A. Silar, supt.)

Texas Gas Transmission Corp.—580 miles, 26-in., proposed, Louisiana and Kentucky.

Texas-Ohio Gas Co.—1,350 miles, 30-in., authorized, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

Union Oil Co. of California.—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles Basin.

United Fuel Gas Co.—32 miles, 20-in., under way, Lanham to Broad Run, W. Va.

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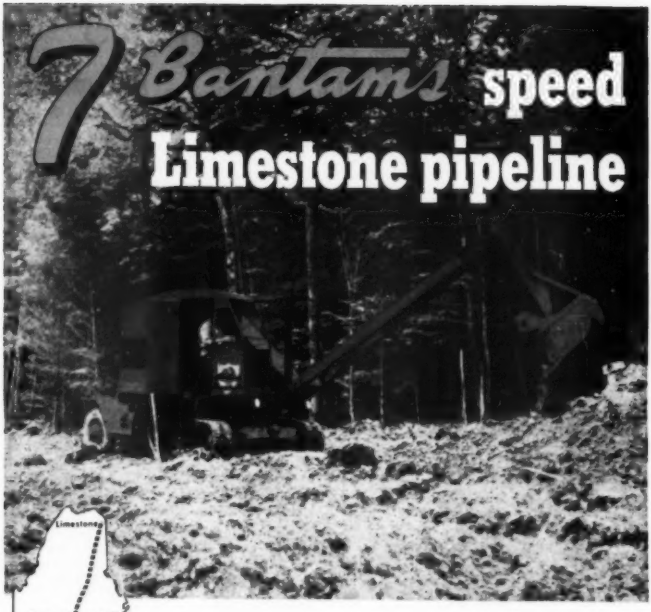

To speed excavation of the new 200-mile pipeline supplying the B-36 Bomber Base at Limestone, Me., W. H. Hinman, Inc., of North Anson, hired 6 high-speed Bantam Back Hoes, equipped with 30" buckets. A 7th truck-mounted Bantam crane unloaded the entire 200 mi. of 6" pipe from 11 widely separated sidings — *handled 19,800' from 3 locations, each 15 miles apart, in one typical day,* including travel time and positioning cars with Bantam drag cable.

Working through swamps, steep grades and difficult river crossings, where their low weight and sure-footed traction could be used to best advantage, the Bantam Back Hoes completed approximately 40 miles of trench 30" wide and 30" deep in 2 months. Despite unusually tough going, *production averaged 123.5' of trench hourly for each machine.*

You, too, can improve job efficiency with low-cost Bantams. Write for details. Schield Bantam Co., 243 Park St., Waverly, Iowa.

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5-ton capacity Bantam crane easily unloaded entire 200 mi. of 6" pipe from 11 scattered locations.

SCHIELD BANTAM

Cranes • Excavators

Get more jobs done at less cost

H. L. Gentry Construction Co., contractor. Frank Morris, spreadman at Charleston, W. Va.

United Gas Pipe Line Corp.—315 miles, 24-30-in., contracted, Agua Dulce to near Goodrich, Tex. Oklahoma Contracting Co., contractor. Panama Shiflett, spreadman, El Campo, Tex.; Ray Law, spreadman, Victoria, Tex.

United Gas Pipe Line Co.—510 miles, 20 to 30-in., under way, Agua Dulce, Tex., to Monroe, La. River Const. Corp., contractor.

(Spread 1) 51 miles, 30-in., from Pearl River north and south of Jackson, Miss. Red Tatom, supt., at Jackson.

(Spread 2) 45 miles, 30-in., McComb to Pearl River south of Jackson. Merle Tatom, supt., at Hazelhurst.

(Spread 3) 30 miles, 30-in., Kosciusko south toward Jackson. Jimmy Reed, supt., at Kosciusko.

(Spread 4) 29 miles, 12-in., Lafayette to Jeanerette, La. Roy Earnhart, spreadman at Jeanerette.

(Spread 6 and 7) 97 miles, 20-24-26-in., under way, Houston to Dupont's Sabine River Works, Orange, Tex. Barney Hall, supt., at Port Arthur.

(Spread 6) 20 miles, 20-in., under way, Orange to Port Neches, Tex. (This spread to move on to Trinity River and work toward Houston). Banty Traweek, spreadman.

(Spread 7) 20-26-in., under way, Port Neches to Fannett, Tex. (This spread will continue on to Trinity River). Borger Red McMenamy, spreadman.

124 miles, Sterlington comp. sta., near Monroe to Jackson, Miss.

23 miles, 8-12-16-in., South Louisiana facilities.

53 miles, 24-in., authorized, Texas.

50 miles, 16-in., authorized, Baldwin County, Alabama, southeasterly to Escambia County, Florida.

All contracted by River Const. Corp., a joint venture including Oklahoma Contracting Co.; J. Ray McDermott & Co., Inc., and Morrison-Knudson. Inspection by Brown & Root, Inc.

U.S.E.D.—18 miles, 8⅝-in., contracted, Norwalk to Long Beach, Calif. J. E. Young Pipeline Contractor, Inc.

Utah Natural Gas Co.—360 miles, 22-in., proposed, San Juan Basin area to Salt Lake, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Western Kentucky Gas Co.—2 to 4-in., under way, additions to present system; Modern Welding Co., Inc., contractor.

Western Pipe Lines.—1,200 miles, 22-in., planned, southern Alberta to Duluth, Minn.

West Texas Gas Co.—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

West Texas Gas Co.—32 miles, proposed, Potter and Randal counties, Texas.

Foreign Crude-Oil Pipe Lines—Planned and Under Way

Alberta-Vancouver Oil Pipe Line Co.—(Brokaw, Dixon, McKee).—972 miles, 16-in., proposed, Edmonton via Pincher Creek, Alta., Idaho and Washington states to Vancouver, B. C.

Cia. de Petroleo Ganso Azul, Ltd.—48 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

Condor.—90 miles, 12-in., under way, Genoa to Rho, near Milan, Italy. Soc. Ital. Condotte Acqua Montubi, contractor. Completion date 7-31-52.

Creole Petroleum Corp.—143 miles, 26-in., authorized, Ule (State of Zulia) to Amuay (State of Falcon). Completion date March 1953.

Creole Petroleum Corp.—25 miles, 34-in., authorized, Lagunillas to La Salina (State of Zulia). Completion date April 1953.

Direccion General de Yacimientos Petroliferos Fiscales.—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Iraq Government.—135 miles, 12-in., proposed, from Iraq Petroleum Co. at Baiji to Baghdad, Iraq. Construction 1952. M. W Kellogg, contractor.

Iraq Petroleum Co., Ltd.—556 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

Iraq Petroleum Co., Ltd.—72 miles, 12¾-in., Zubair to Fao. Arabian Bechtel Co., contractor. Completion date 12-51.

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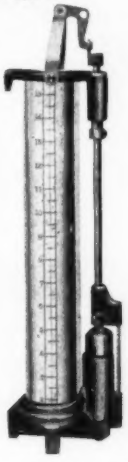

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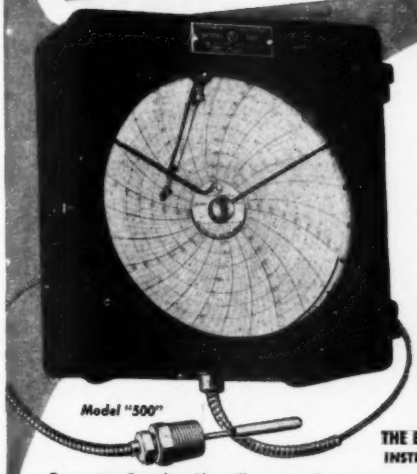

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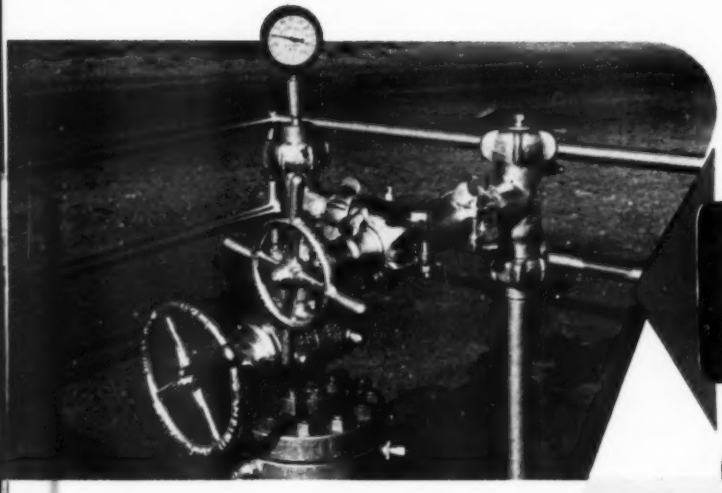

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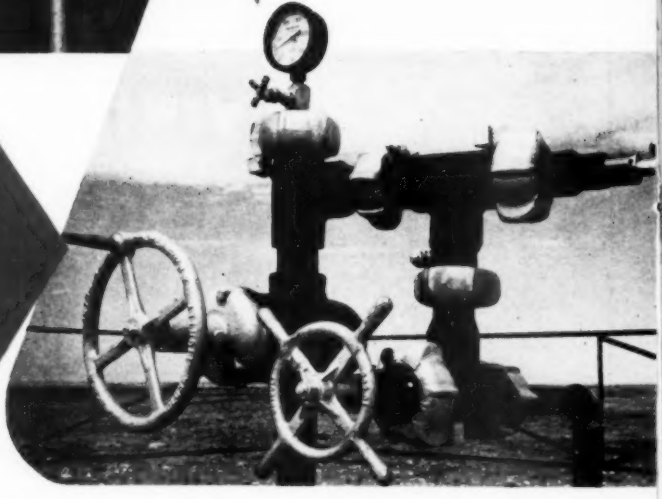

The UNIBOLT Wing Valve, designed originally for use as an adjustable choke where well conditions did not demand a positive choke, has become popular with production men as a dependable valve for numerous services where a positive shut-off is essential. Christmas trees for both producing and injection wells, high pressure oil and gas separator manifolds, heater manifolds, meter runs and similar services are made to order for this dependable, yet relatively low-cost, valve. Since high pressure wells are usually produced through a small positive choke, the one-inch opening provided in the UNIBOLT Wing Valve when in full open position is ample to assure unrestricted flow. An additional advantage is the replaceable stem and seat, which may be changed in the field, easily and at low cost. A recent refinement in its mechanical design is the stem packing which, after the valve is assembled at the factory, never requires adjustment or tightening.

Having standard UNIBOLT Couplings between its component parts, the UNIBOLT Wing Valve is easily dismantled or assembled, and may be readily converted to a Positive Choke Body by substituting a blanking plug and positive bean for the stem and seat assembly.

Available in 6,000, 10,000 and 15,000 lbs. test, and in corrosion resistant alloy.

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HOUSTON TEXAS

Kuwait Oil Co., Ltd.—10 miles, 20-in., authorized, 3rd transit line Burgan-Ahmadi. Completion date 2-52. 6 miles, 30-in., authorized, 6th gravity loading line, Ahmadi-Mina al Ahmadi. Completion date 6-52. 5 miles, 16-20-in., authorized, Burgan field—oil cillecting line. 2-52.

Middle East Pipelines, Ltd.—800 miles, 34-35-in., planned, Iran to a Levantine port.

Petroleos Mexicanos.—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

Petroleos Mexicanos.—100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

Shell Caribbean Petroleum Co.—160 miles, 30-in., under way; Palmajero to terminals on the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 4-52. Land sections contracted by Williams Brothers, de Venezuela, S.A., Charles P. Williams, manager, Marvin E. Jones, superintendent. Water crossings contracted by Mahoney Contracting Co.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pto. Nino to La Dorada.

Trans-Mountain Oil Pipe Line Co.—715 miles, proposed, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers.

Foreign Products Pipe Lines—Planned and Under Way

Colombia Ministry of Petroleum.—90 miles 6-in., planned, Puerto Berrio to La Dorada, Colombia.

Colombia Ministry of Petroleum.—113 miles, 6-in., contracted, Puerto Berrio to Acededo near Medellin, Colombia. Carolina Construction Co.

Colombian Ministry of Petroleum.—75 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 4-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

Estrada de Ferro Santos a Jundial.—32 miles, 18-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor. Completion date 12-51.

Governments of Southern Rhodesia and Portuguese East Africa.—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

Imperial Oil Co., Ltd.—230 miles, 10-12-in., under way, Sarnia via London, Hamilton to Toronto, Ont., Canada. Comstock Midwestern, Ltd., contractor. Completion date July 1952.

Petrocongo (Sub. Cie. Financiere Belge des Petroles, S.A.).—225 miles, considered. Ango-Ango to Leopoldville, Belgian Congo.

Petroleos Mexicanos.—155 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

Societe des Transports Petroliers par Pipe Line.—140 miles, 10-in., under way, Le Havre to Paris, France. Entrepose, contractor. Completion date 1952.

State of Cundinamarca, Colombia.—120 miles, 6-in., Puerto Salgar to Bogota, Colombia; Williams Brothers Co.; David Louthen, manager, Bogota.

Trans-Northern Pipe Line Co.—400 miles, proposed, Hamilton, Ont., to Toronto, Ont., to Montreal, Que., Canada.

Foreign Natural-Gas Pipe Lines—Planned and Under Way

Azienda Generale Italiana Petroli.—110 miles, 12-14-16-in., planned, Cortemaggiore to Genoa.

Azienda Generale Italiana Petroli.—145 miles, 14-16-in., under way, Cortemaggiore to Torino. Completion date 1951.

Canadian Delhi Oil Co. (Subsidiary Delhi Oil Co.).—2,132 miles, proposed, Alberta, Toronto, Montreal.

Direccion General del Gas del Estado.—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

Northwest Natural Gas Co.—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos.—205 miles, 16-in., considered, Monterrey to Torreon, Mexico

Petroleos Mexicanos.—260 miles, 20-in under way, Monterrey to Tampico and Poza Rica, Mexico.

Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.—600 miles, planned, Reynosa, Tamaulipas, to Tampico-Poza Rica, Mexico.

Trans-Canada Pipe Lines, Ltd.—Proposed, Alberta to Toronto to Montreal.

Venezuela Atlantic Transmission Corp.—195 miles, 10-12-16-in., under way, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaria, Maracay, and Valencia. Contracted by Williams Brothers, de Venezuela, S.A., B. E. Barnes, manager.

Westcoast Transmission Co., Ltd.—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

Westcoast Transmission Co., Ltd.—280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

Western Pipe Lines.—1,033 miles, 24-in., proposed, from Southern Alberta, eastward across the Canadian Prairies, serving principal towns and cities along the route to a point near the International Boundary.

Union Installing Diesels At Junction Pump Station

LOS ANGELES.—Modernization of Union Oil Co.'s pump station at Junction in western San Joaquin Valley is getting under way. Six diesels designed to operate on low-gravity crude will be installed in place of the old steam-powered equipment. The diesels, of 220 hp., will drive quintuplex pumps rated at 500 bbl. per hour.

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HYDRAULIC AGITATED KETTLE . . . Model 211-30, 30 barrel capacity equipped with hydraulically controlled agitator, low pressure burner, dial type thermometer and a Wisconsin air-cooled gasoline engine with electric starter. The burner distributes heat equally over all parts of the bottom, and is designed to avoid hot spots, thus eliminating replacing bottoms. Available on Athey tracks or on skids. Also available in 23 barrel capacity.

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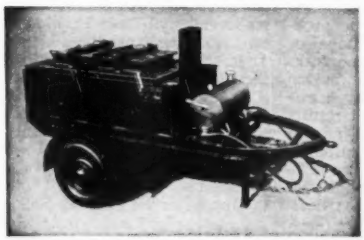

HAND AGITATED PATCH KETTLE . . . Model 84-HD, 225 gallon capacity. This kettle has a manually operated agitator and can be operated from either side. Fast trailing is possible with the Model 84-HD Kettle. A one man operated stiff leg of strong channel iron is provided at the front to support the kettle in the standing position. Also available in 165 gallon capacity.

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REFINING

Indiana Standard Projects Refinery in North Dakota

CHICAGO.—Standard Oil Co. (Ind.) is planning construction of a refinery in North Dakota to handle Williston basin crude.

A. W. Peake, president, said the refinery will have an initial capacity of 15,000 bbl. per day, but will be built so that it can be expanded to handle at least 30,000 bbl. as crude production and markets grow.

Peake said a site will be chosen soon, and applications will be filed for necessary government authorizations. Construction will probably not begin until 1953, he said, although engineering work has already started.

The company will build the refinery, he said, because it considers the basin a promising source of crude.

Three affiliated firms of Indiana Standard are operating in the basin. Stanolind Oil & Gas Co. has oil leases on about 4,000,000 acres. Service Pipe Line Co. finished the first crude-gathering system in North Dakota early this year and began shipping crude through it the first of this month. Stanolind Oil Purchasing Co. is a crude buyer in the area.

Tide Water, Monsanto Plan New Sulfuric Acid Plant

SAN FRANCISCO. — Tide Water Associated Oil Co. and Monsanto Chemical Co. are planning construction of a 250-ton sulfuric acid plant on an 86-acre site at Avon, Calif.

Tide Water will pipe waste sludge and hydrogen sulfide from its nearby refinery to the plant for use as raw material. The new plant will pipe most of its production of sulfuric acid back to the refinery for use in processing. The remainder will be sold to help meet growing needs for the acid in the San Francisco Bay area.

The plant will be owned jointly by Tide Water and Monsanto. It will be designed by Monsanto, built by Leonard Construction Co., Chicago, and operated as part of Monsanto's western division.

A flexible, low-temperature method for recovering acid from refinery sludge, the Monsanto - Ross - Wilde process, will be employed. The process recovers a high percentage of acid in refinery sludges in the form of a gas which has a higher sulfur content than that obtained by burning elemental sulfur. The acid resulting from treatment of this gas is "water white" and is distinguishable from new acid produced from elemental sulfur. The process was developed in World War II and has been perfected since then.

The new plant is expected to be in operation by the end of 1952, according to Irving C. Smith, general manager of Monsanto's western division.

Program Shaping Up for Lube-Committee Meeting

NEW YORK.—The program for the first 1952 meeting of the lubrication committee of the American Petroleum Institute began to shape up into final form last week with the addition of four more speakers.

The meeting will be held February 18-19 in the Book-Cadillac Hotel in Detroit.

Committee Chairman B. G. Symon, Shell Oil Co., said speakers presently scheduled to address the open session February 18 include:

John C. Hale, Refiners Transport & Terminal Corp., Detroit, on "Quality Lubricants as an Essential to Fleet Maintenance Programs;" Lyle E. Calkins, Willys-Overland Co., Toledo, on "Engine Oil Dopes;" C. G. A. Rosen, Caterpillar Tractor Co., "Cooperation Between Two Industries;" C. W. Georgi, Quaker State Oil Refining Corp., "Some Automotive Lubrication Problems From an Oil Marketer's Viewpoint;" C. T. Doman, Ford Motor Co., "Service Approach to Customer Satisfaction;" M. E. St. Aubin, General Motors Corp., "Planning and Manning for the Job Ahead."

The February 19 session will be devoted to committee reports and business affairs, including a report on the balloting for a proposed change in crankcase-oil nomenclature.

Diamond Alkali to Build First Petrochemical Plant

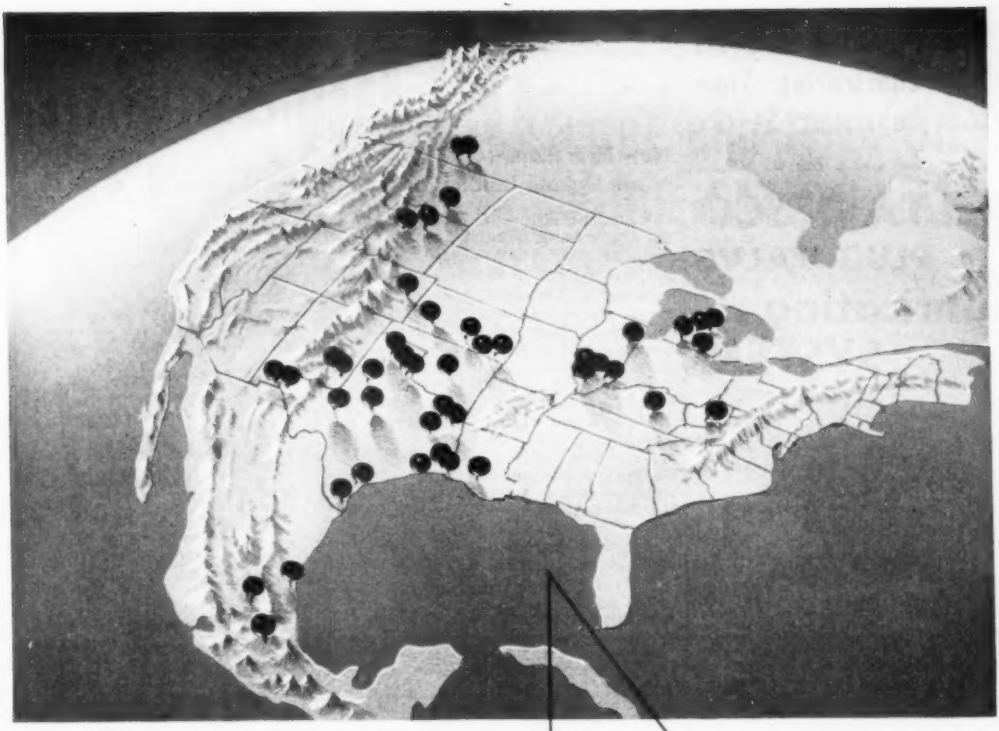
HOUSTON.—Diamond Alkali Co. has revealed plans to build its first petrochemical plant adjacent to its present inorganic chemical plant at Deer Park near here.

New facilities, estimated to cost from $1,500,000 to $2,000,000, will produce vinyl chloride and perchloroethylene from petroleum feed stocks and products of the inorganic plant.

The company presently is nearing completion of an expansion program at its original Deer Park plant, built in 1948, which produces caustic soda, soda ash, and chlorine. The expansion will increase capacity 50 per cent.

Operations of the two plants will be closely coordinated. When construction is completed, total investment at Diamond Alkali's Deer Park site will be between $20,000,000 and $25,000,000.

Contractor for the expansion of the inorganic plant is Brown & Root, Inc.



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DELTA-DESCO PLUG VALVE Lubricating SYSTEM

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DELTA LUBRICANTS — Only 4 Desco Standard Service Lubricants and 3 Special Lubricants do the entire job. Packed in convenient, time-saving, individual barrel size sticks. Packed 12 sticks to a carton, 6 cartons in a case.

DELTA GUN — Lightweight, all steel, chrome finish. Easy to carry, easy to load. Fast snap-on, snap-off operation. Develops 10,000 pounds pressure.

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Contract for erecting the new petrochem facilities has not been let. Preliminary work on foundations, however, has already begun, and it is planned to start actual construction soon.

New Firm Plans 10,000-Bbl. North Dakota Installation

WASHINGTON. — Williston Refining Co., a recently organized firm, is planning construction of a 10,000 bbl. per day refinery in North Dakota.

James P. Dunnigan, who heads a group sponsoring the project, said the refinery initially will have topping, vacuum, and platforming units designed by Universal Oil Products Co. It will cost $5,000,000, he said, and probably will have catalytic cracking facilities added within a year or so.

Dunnigan, who also heads Producers Refining, Inc., at West Branch, Mich., said an application for materials assistance has been filed with the Petroleum Administration for Defense. The firm also intends to seek a certificate of necessity for accelerated tax amortization.

Refining Briefs

Second-quarter exports of tinplate for petroleum packaging have been set at 14,500 short tons, a cut of 2,000 tons from the current quota of 16,500 tons fixed by the Office of International Trade. The OIT intimated, however, that the loss of material may be less than indicated because of expanding tinplate production available outside the United States.

Phillips Chemical Co. has arranged with a group of banks for $50,000,000 credit on a standby basis to finance important chemical projects. Some of the money will be used to build the petrochemical plant started recently by the company near Houston. Funds also will go into new production of sulfur, carbon black, pyridines, and other chemicals at plants involved in the expansion program.

American Cyanamid Co. will raise production of synthetic cracking catalyst at its new Michigan City, Ind., plant through an expansion to be completed about the middle of this summer. When work is completed, the enlarged plant will produce enough catalyst to serve a refining capacity of 800,000 bbl. daily, the company said.

Sinclair Oil Corp. has acquired all capital stock of Stoll Oil Refining Co., Inc. Properties involved include bulk plants, barges, terminals, and other distribution facilities in Indiana and Kentucky. Sinclair said it would operate the company as a wholly owned marketing subsidiary, retaining the company's name and marketing personnel.

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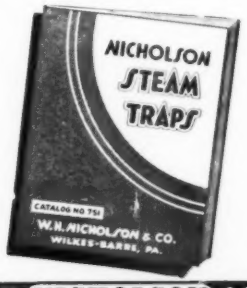
Nicholson Trap Catalog 751

Newly revised, this standard 32-page reference describes traps for all mediums: thermostatic and metal expansion for pressures to 225 lbs; weight and piston-operated for heavy duty. Complete with installation diagrams and formulae for determining proper size trap.



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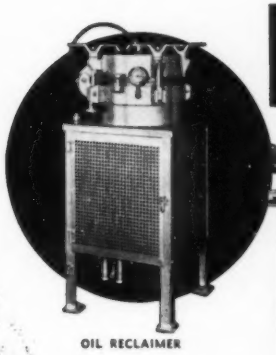

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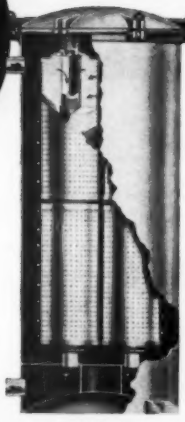

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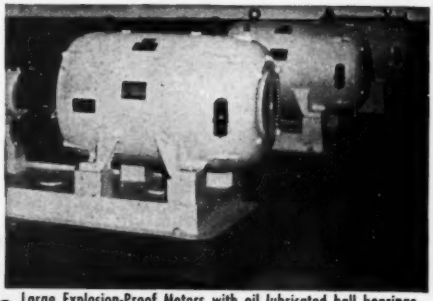

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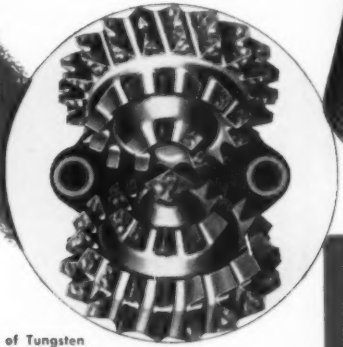

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Among the Drilling Contractors

McEwen Takes Job With California Contractors

John McEwen, formerly vice president and general manager of the California division, International Derrick & Equipment Co., now is affiliated with the California drilling contractors' statistical committee as consulting engineer. The committee, with offices at Los Angeles and composed of a group representing approximately 30 California contractors, was formed to accumulate statistical data and operational information on drilling for the industry.

JOHN McEWEN

McEwen had been with Ideco since 1930, starting at Columbus, Ohio, as chief engineer. Subsequently, in 1931, he became manager of engineering and production at the company's Torrance, Calif., plant, before being advanced to his more recent position as vice president and manager of the California division. Previous to his Ideco connection, he had been with Lee C. Moore Corp. since 1921, with which company he advanced to chief engineer. He is a graduate (1919) in mechanical engineering of the University of Pittsburgh.

Field Drilling Co., San Antonio, has a rig working for Jack Flaitz on the John N. Bennett ranch in Jackson County, Texas Gulf Coast area, and another drilling for Jake L. Hamon on the latter's Rhodes lease in McMullen County, southwestern Texas.

Summit Drilling Corp., Tulsa, has a 5,000-ft. contract with Sun Oil Co. for a wildcat test located in the NE NE SW 16-11n-5e, 6 miles southwest of Prague, in Pottawatomie County, Oklahoma. The test is designated as 1-A School land, and is 2 miles east of the Northeast Shawnee pool.

Longhorn Drilling Corp., San Antonio and Three Rivers, Tex., has contracted for the drilling of two additional wildcat tests in southwestern Texas, one in McMullen County, and the other in Dimmit County. The McMullen County test will be drilled for L. M. Glasco of Dallas as 1 G. A. Lawrence with location in Section 70, C. C. Shumway subdivision of the Shiner ranch. Contract is for 7,500 ft. The Dimmit County test will be Spartan Drilling Co. 1 N. C. King, located in the Blas Reyes Survey A-4. It is projected to approximately 5,000 ft.

Lohnman-Johnson Drilling Co., Great Bend, Kans., is making hole on a new wildcat test, located in the NE NE NE 21-9-20, in the Palco area, southwestern Rooks County, Kansas. The test is being drilled under contract for Continental Oil Co. on the latter's Marcotte lease.

Davenport Drilling Co., Oklahoma City, has a rig working for William H. Atkinson on a wildcat location, 1-B Edwards, NW NW NE 4-3s-6w, ¾ mile southwest of the South Palacine field in Stephens County, southern Oklahoma. Hole is projected to 2,300 ft.

Ben Novak is moving in a small rotary rig to drill another well for George Martin in the newly opened second Dutcher sand development in Haydenville pool, Okfuskee County, Oklahoma. Latest operation is 2-A Parsons, NE NE NE 28-13n-10e. Pay zone is around 2,900 ft.

Crescent Drilling Co., Inc., Monroe, La., is drilling at a new test which Atlantic Refining Co. has projected for the area 4 miles north of Water Proof, in southern Tensas Parish, eastern Louisiana. The new test, contracted to 9,500 ft., is 1 Butts, C SW NE 12-10n-10e. It is northeast of the Atlantic's recently completed discovery well.

Montgomery Drilling Co., El Dorada, Ark., has contracted with Southern Gas Producing Co. for an 8,500-ft. test to be drilled at a wildcat location 1½ miles southwest of Point, Union Parish, northeastern Louisiana. Location is for 1 Foster, in the C NW SW 8-19n-2e.

Rowden, Darden & McRae are contractors on a 2,400-ft. Shannon sand exploratory test which Frank Gower and associates are starting on the Burris dome, in Johnson County, Wyoming. Location is on government land in the NW SE NE 19-42n-79w.

Goldsmith & Perkins, Duncan, Okla., will drill a 3,850-ft. Aldridge sand test which Jones & Young have projected for the new Springer sand producing area on the west flank of the Velma field, in Stephens County, Oklahoma. Location, in the NE NW SE 34-1s-5w, is about 900 ft. northwest of a recently completed Sims

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sand producer drilled by these contractors for the same operators.

Graham Drilling Co. is the contractor on a projected Wilcox sand test which Beach & Talbot are starting at a wildcat location 2 miles southeast of Stillwater, Payne County, Oklahoma. The test will be 1 Lindsenmeyer, with location in the SW SW SW 29-19n-3e. Objective is expected around 4,600 ft.

Cook Drilling Co., Fort Worth, has taken a contract for a Smackover lime test to be drilled for Stanolind Oil & Gas Co. in the area three miles northeast of Antioch, Claiborne Parish, northern Louisiana. Location is for 1 Rainach, N½ NW SE 17-22n-5w. Objective will require drilling to between 11,000 and 12,000 ft.

Wheless Drilling Co., Shreveport, is starting a projected 12,000-ft. test about 3½ miles southwest of Carterville, northern Bossier Parish, northern Louisiana. The test, 1 Goodwin, C SW NW 29-23n-12w, is being drilled for Continental Oil Co. Projected depth should give a look at the Smackover lime.

Trigg Drilling Co., Oklahoma City, has two new wildcat tests under way for V. A. Brill of Houston in northeastern Cleveland County, Oklahoma. One is 1 School land, in the NE NE NE 16-10n-1e; the other, located 2½ miles to the south, is 1 Wilson, in the NW NW SE 28-10n-1e.

Whitely Drilling Co., Dallas, is moving a rig from Wood County to Kaufman County, in eastern Texas, where it has a contract for a 5,000-ft. Paluxy sand test to be drilled for American Liberty Oil Co. Location of the new test, 1 Travis, is in the R. C. Dickson Survey, 6 miles southeast of Terrell.

Gilger Drilling Co., Houston, has another deep test under way in the Shuteston field, St. Landry Parish, coastal Louisiana, where it is drilling for Grubb & Hawkins. Latest operation is 2 Dimmick, in 173-7s-4e. Contract is for 10,500 ft.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 2-4-52	Change week ended 1-28-52	Change week ended 2-5-51
Gulf Coast	586	— 6	+119
N. & W. Tex.-N. M.	1,036	+ 9	+328
Ark.-N. La.-E. Tex.	168	—12	+ 42
Oklahoma	363	+23	+105
Kansas-S. Nebraska	186	+13	+ 13
Illinois-Eastern	92	+ 7	+ 9
Rocky Mountains	159	— 1	+ 58
Pacific Coast	170	+ 1	+ 48
Total United States	2,740	+34	+722
Western Canada	184	+11	+ 83
Total	2,924	+45	+805

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 184 and 185.

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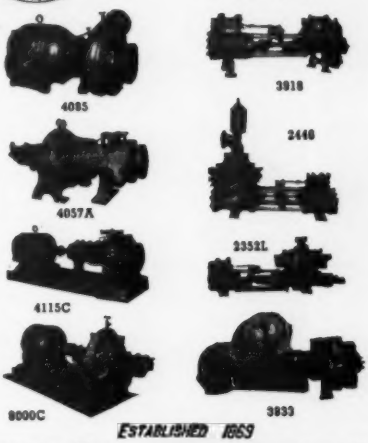

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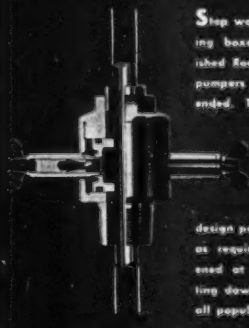

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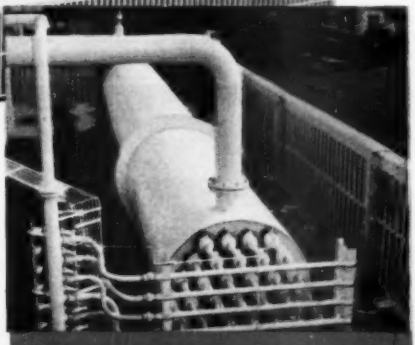
Fluor Cooling Tower Testing Facilities. This commercial-size installation consists of a pump house, instrument house, 20,000,000 BTU/H boiler, test basin, and a 40' high test tower.



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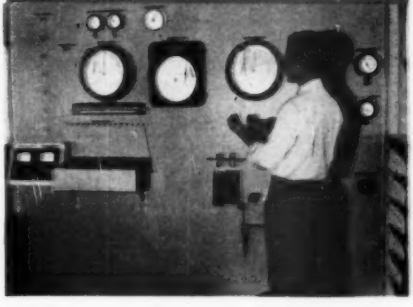

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NATURAL GAS

Texas Gas Gatherers Taxed $1,053,000 in December

HOUSTON.—Collections of Texas' natural-gas gathering tax in December totaled $1,052,637.94, the state comptroller revealed last week.

More than half of the sum, $626,625.42, was paid under protest and will be placed in escrow. This is the first time the tax take has amounted to more than $1,000,000 since the tax went into effect last September. The previous top collection was the $970,588.14 in November.

The lineup of companies protesting the tax remained relatively unchanged. Largest of seven companies which filed protested payments for the first time in December were LaGloria Corp. and Lavaca Pipe Line Co., which paid $5,760.55 and $3,690.87, respectively.

Biggest jump in taxes paid was registered by Texas-Illinois Natural Gas Pipe Line Co. The company paid $34,745.94 in December as compared with a tax of $3,952.26 in November. The tax rise reflects a big increase in the gathering of gas by the firm as its new line went into full-scale operation early in the month.

Final totals show that 109 firms paid without protest during the month, while 79 protested. In November these figures were 117 and 77, respectively.

Meanwhile, Price Daniel, Texas' attorney general, completed filing answers to 42 lawsuits attacking validity of the tax. He denied all objections raised by the firms who are seeking to recover tax money paid under protest.

Daniel said he would try to get the suits up for trial at the earliest possible date.

Operating Revenues Climb 22 Per Cent in November

WASHINGTON.—Natural-gas companies reported November operating revenues of $146,906,259, an increase of 22 per cent over receipts in November 1950, the Federal Power Commission has revealed.

For the year ended November 30, 1951, the companies took in a total of $1,540,212,446. This is up 21.2 per cent over the take during the same period a year earlier.

Reports filed by 83 natural-gas companies with the commission show that operating income for November 1951 amounted to $19,626,556, up 14.2 per cent from the $17,188,737 reported for November 1950.

Gas operating-revenue deductions during the month amounted to $127,429,884, up 23 per cent. Of the total, operating expenses accounted for $99,792,802, depreciation for $11,377,103, and taxes for $16,260,069.

Gas sales to ultimate consumers increased 14.9 per cent to more than 194 billion cubic feet. Sales to residential and commercial consumers climbed 34.2 per cent and 31.4 per cent, respectively, while those to industrial consumers rose 5.5 per cent.

Net income of the reporting companies for the month was $14,994,356, a gain of about 12.2 per cent.

Operators in Helen Gohlke Field Plan Stripper Plant

CORPUS CHRISTI.—Plans to build a $1,250,000 compressor and stripper plant to process flare gas from wells in expanding Helen Gohlke oil field of Victoria and De Witt counties, South Texas, have been announced by Jerome O'Brien, vice president of Jergins Oil Co. of Texas.

The plant will be built by four major operators in the field, Jergins, Shell Oil Co., Humble Oil & Refining Co., and Kirby Petroleum Co. Shell will operate the facilities which will be built on a Shell lease straddling the two counties.

O'Brien said Olson Brothers, Houston, will start construction of the plant as soon as materials now on order can be obtained. Flare gas will be stripped of natural gasoline and the residue compressed for sale to pipe lines.

Firm Drops Fight to Block Rival's Line to Salt Lake

SALT LAKE CITY.—Utah Pipe Line Co. has abandoned its struggle to obtain a reversal of an order by the Utah Public Service Commission granting a conditional permit to another firm to build a natural-gas line to this city.

Utah Pipe Line, a subsidiary of Delhi Oil Corp., asked the state's Supreme Court to dismiss its joint action against the commission and Utah Natural Gas Co. Utah Natural has a permit from the commission to build a $32,000,000 line from southeastern Utah to Salt Lake, provided it can prove sufficient gas reserves to justify construction and can present firm financial commitments by April 7.

The Delhi subsidiary asked for dismissal of the action after the parent firm announced sale of its reserves in New Mexico to El Paso Natural Gas Co. These reserves reportedly had been intended as a source of supply for a proposed line to be constructed by Utah Pipe Line from the Aztec, N. M., area to Salt Lake.

Informed sources say Utah Natural will ask for an extension of the April 7 deadline to allow time for projected drilling in three counties in the south-central and southeastern part of the state.

Bibliography Published on Temperature Measurement

WASHINGTON.—The National Bureau of Standards has published a new bibliography to facilitate reference to literature on measurement and control of gas temperatures.

The bibliography, by Paul Freeze of the bureau's combustion-laboratory staff, was prepared in connection with a broad program now under way at the bureau which involves development of more accurate and rugged temperature-measuring instruments, the perfection of various spectroscopic methods, extension of theoretical background, and a study of real significance of measured values of these temperatures.

Classified topically according to instrument type, the publication contains about 400 pertinent references. It provides investigators with an organized list of articles during the last 20 years on gas-temperature measurement.

West Texas Gas Withdraws Application for Expansion

WASHINGTON.—West Texas Gas Co., Lubbock, Tex., has been allowed to withdraw an application filed with the Federal Power Commission for approval of a construction program designed to increase capacity of its natural-gas system by 24,000,000 cu. ft. per day.

The proposed project would have raised capacity of the company's system to 135,000,000 cu. ft. per day. It involved construction of about 32½ miles of pipe line and compressor-station additions totaling 2,010 hp. in Potter and Randall counties, Texas. Cost was estimated at $1,636,145.

West Texas said the application no longer conformed to the factual situation and that a new application will be filed.

The company presented testimony in favor of its motion at a consolidated hearing January 16. The proceeding was recessed subject to further order by the commission.

At the same time the commission heard testimony on two related applications filed by Southern Union Gas Co., Dallas, and El Paso Natural Gas Co., El Paso, Tex. Southern Union wants to boost gas deliveries in the Clovis, N. M., area, while El Paso seeks to cut back deliveries of gas to West Texas Gas, which supplies Southern Union. No decision on these two applications has been announced.

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PIPE LINES

Service Expanding System In Oklahoma and Kansas

TULSA.—Service Pipe Line Co. has begun construction of about 30 miles of 20-in. loop lines in Oklahoma and Kansas to enlarge capacity of its crude-oil trunk system north of Drumright, Okla., by 38,000 bbl. per day.

C. M. Scott, general manager, said the loops will be laid parallel to the company's existing lines in two 15-mile sections. One loop will extend north from Drumright, the other south from Havana, Kans. Construction of the Drumright loop will include a 2,600-ft. crossing of the Cimarron River. Contract for construction has been let to G. G. Griffis Construction Co., Tulsa.

Right-of-way clearance south of Terlton, Okla., began early in January. When this section is completed south of Drumright, contractor will start on the second loop working north from Hulah, Okla., to Havana.

Service recently completed construction of the first crude-gathering system in North Dakota. Regular shipment through the lines for transportation by rail to refineries began the first of this month.

The gathering system will bring crude from Beaver Lodge field of Williams County to Tioga, N. D., where loading-rack facilities have been built.

The system consists of about 11 miles of 6-in. and 4 miles of 4-in. line. It is capable of pumping about 18,000 bbl. of oil per day. Beaver Lodge crude is produced by Amerada Petroleum Corp. and is consigned to Northwestern Refining Co. at Minneapolis.

Emergency Line Moving Oil Around Lock to Chicago

CHICAGO.—The emergency pipeline bypass around the Marseilles Lock on the Illinois Waterway is reported keeping products moving efficiently from southern refinery sources into the Chicago market.

At the end of January, tows collected adjacent to the lock had cleared their cargoes.

James Marko, superintendent of the line, said that in the first 10 days of operation the line moved about 350,000 bbl. of products from barges at the lower end of the waterway to vessels on the northern end. This is an average of about 35,000 bbl. per day.

The 10-in. emergency line was placed in operation January 18 and was then expected to be in operation for about 6 weeks while the lock is being repaired.

First estimates placed capacity of the line between 20,000 and 80,000 bbl. daily, depending on type of product moved and whether the barges had pumps to supplement the two diesel pumps on the line.

Great Lakes to Prohibit Product Swaps by Shippers

KANSAS CITY.—Great Lakes Pipe Line Co. will change its policy March 1 to prohibit transfer of products between shippers using the line.

Shippers will retain title to all product tendered to the line until it is moved but will be responsible for any "demurrage" which may accrue during its storage.

Great Lakes previously had reduced free time for products in storage from 60 to 30 days after which time the firm applies 1 cent per barrel "demurrage" charge.

Withdrawal authorizations from shippers to other companies not using the line will continue to be honored by Great Lakes.

The system has terminals at Kansas City, Kans.; Omaha; Des Moines, Iowa City, Mason City, and Sioux City, Iowa; Minneapolis, Alexandria, and Mankato, Minn.; Chicago; Sioux Falls and Watertown, S. D.; Fargo and Grand Forks, N. D.

El Paso Revamps Plans for Boosting System's Capacity

WASHINGTON.—El Paso Natural Gas Co. has filed amended applications with the Federal Power Commission proposing a 300,000,000 cu. ft. per day expansion of the capacity of its system serving New Mexico, Arizona, and California, and extension of the system to Nevada.

Under the new proposal, El Paso would build new facilities to deliver an additional 300,000,000 cu. ft. of gas per day jointly to Pacific Gas & Electric Co., San Francisco; and Southern California Gas Co. and Southern Counties Gas Co. of California, both of Los Angeles. The company also would supply 20,000,000 cu. ft. of gas per day to Nevada Natural Gas Pipe Line Co., Las Vegas, Nev., for markets in Nevada. In addition El Paso asks that restrictions on annual gas deliveries from the San Juan basin area be removed. The entire program would cost an estimated $108,882,686.

The expansion involves construction of 170 miles of main-line loops, 152,360 additional compressor horsepower at new and existing stations, field gathering lines, dehydration plants, a gasoline-absorption plant,

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United Seeks FPC O.K. for Increase in Line Capacity

WASHINGTON.—United Gas Pipe Line Co., Shreveport, has filed with the Federal Power Commission for authority to add compressor facilities increasing capacity of its line from Napoleonville, La., to Kosciusko, Miss., by 100,000,000 cu. ft. of gas daily.

The added capacity of the line, which is now under construction, would be used to serve Southern Natural Gas Co., Birmingham.

United plans to build new compressor stations at Napoleonville and Jackson, Miss., with a total of 13,280 hp. Two authorized stations, one near Montpelier, La., and one in Walthall County, Mississippi, would have compressor facilities boosted a total of 8,000 hp.

The additional 100,000,000 cu. ft. of gas would be delivered to Southern Natural through a proposed meter station near Kosciusko.

Estimated over-all cost of the expansion is about $5,764,000.

Conoco Lets Line Contract

McALLEN, Tex. — Continental Oil Co. has let contract to Western Construction Co., Hobbs, N. M., for the first 50 miles of its 105-mile, 8-in. crude line from Rincon field in Starr County, Texas, to Port Isabel, Tex.

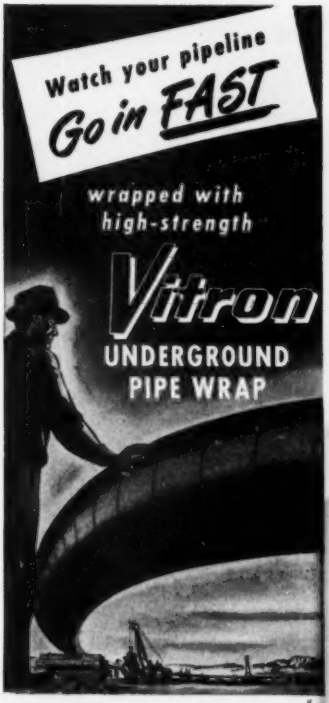
Western will start one spread working out of McAllen immediately. Contract for the remaining 55 miles is expected to be let soon.

The $2,000,000 line will have a capacity of 17,000 bbl. of crude per day.

Pipe-Line Briefs

In a story on progress of Rancho Pipe Line System's projected crude line from West Texas to the Gulf Coast, which appeared in the Journal's January 28 issue, it was wrongly stated that Nantucket Pipe Line Co. was a newly formed successor to Cleveland Pipe Line Co. Nantucket actually is a subsidiary of Eastern States Petroleum Co., Inc. Cleveland Pipe Line's successor is Ashland Pipe Line Co., a wholly owned subsidiary of Ashland Oil & Refining Co. Both are participants in the Rancho project.

Interstate Oil Pipe Line Co. is planning to lay four crude lines totaling 166 miles in Louisiana for which contracts have not been let, according to officials of the company. These include 33 miles, 20-in., Bunkie-Melville; 68 miles, 16-in., Raceland-Anchorage; 18 miles, 12-in., La Rosa-Raceland; and 47 miles, 16-in., Sunset-Anchorage.



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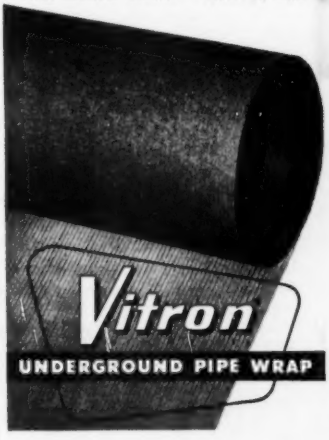

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LEADING THE FIELD OF SEISMIC EXPLORATION

Southernmost Oklahoma's Attractions

JUST north of the Red River, the south bank of which forms the Oklahoma-Texas line, are several small basins which are being studied with increasing enthusiasm.

This entire area is a geologist's nightmare. The Wichita, Arbuckle, and Ouachita mountains exhibit complicated structures and fault patterns; and limited subsurface information indicates that at-least-as-complicated structural features lie at depth in the basin areas to the south of these more obvious distorted features.

The orogenic movements, which occurred throughout much of Pennsylvanian time in this area, were responsible not only for big structures but for rapid facies changes which complicate correlations.

The confusing geology is the pessimistic side of the picture for this area. The other side is exemplified by the fenced area on the sketch map marked "B." Within that small area are the two biggest producing oil fields in Oklahoma: Velma produces 50,000 bbl. daily and Sholem Alechem 25,000 bbl. These big fields were originally discovered in 1917 and 1923, respectively, and were developed in the Pennsylvanian Deese and Hoxbar, principally, though substantial production was developed from Permian stringers in some areas. Their production had leveled off at a comparative low level when a wave of activity that followed a Pennsylvanian-Springer discovery off the northeast flank of the big Velma structure sent their production curves soaring. Not only was Springer production developed, but Deese and Hoxbar production was materially extended. It was found that the "simple folds" on which these fields were located were in reality but segments of broken fault blocks. Flank area activity spread to Hewitt, Healdton, Fox-Graham, and Doyle until now this area has the greatest concentration of proved reserves in Oklahoma.

The basins within the same general tectonic province as this prolific development have been scarcely touched. The Hollis basin has 16,000 ft. of sediments which cut out within a few miles as the Wichita Mountains are approached. Only three significant oil fields have been developed in this basin which is known to contain the types of rocks and traps recognized as fostering the accumulation of oil. The difficulties of complicated structures and changing facies are present here as well as in the area of the Arbuckles. A fault with a displacement of 6,000-10,000 ft. is exhibited at Altus field (A on map).

The Marietta basin is probably the least known of the little-known basins in this area. It runs on down into Texas where it is known as the Sherman syncline. This basin was evidently a high area during at least part of the time that deposition was going on in the Ardmore basin area to the north for the prolific Springer sands are not present and it appears probable that the Mississippian-Caney, the Siluro-Devonian-Hunton, and Ordovician-Viola were also completely ground away before the Deese was deposited. Development in the Sandusky area in the Texas portion of this feature (F on map) has indicated the potentialities of this basin in the post-Springer Pennsylvanian, the Ordovician-Oil Creek, and in the Ellenburger (Arbuckle) and also that the major faulting affected the basin at least this far south. Production in Deese pinchouts has been found near the Red River.

At East Oconee (C on map), in the extreme southwestern end of the McAlester basin, significant gas-condensate reserves are being developed cautiously in Ordovician rocks which also illustrate the extreme faulted nature of reservoirs in this general area. In the portion of the Ouachita Mountain province overlapped by Cretaceous rocks is a possible discovery (D on map) in the Pennsylvanian-Atoka (Gilcrease) which may prove highly significant in this complex area. Southeast and on trend of Cumberland field, an Ordovician producer, is a drilling wildcat (E on map) that roused considerable interest when shows of oil were found in the Ordovician-second Bromide.

Deep drilling and lots of it seems to be the answer for this apparently oil-rich, but neglected, area and judging from the growing interest in its potentialities, it's going to get it.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Shell Oil Co. encountered oil shows in Madison at a Corson County, South Dakota, wildcat, but made sulfur water on tests. Shell Oil Co.'s Pine Unit, Montana, wildcat is completed pumping 467 bbl. of oil, with 25 per cent water, for another Williston Basin discovery. Pure Oil Co. is swabbing for completion at the West Poison Spider, Wyoming, deep test, which has flowed some 48°-gravity oil and will be the world's deepest producer if commercial. Carter Oil Co. found upper Green River heavy black oil on test at the Duchesne, Utah, wildcat.

SOUTHEASTERN NEW MEXICO.—When completed the Buffalo Oil Co. 12-B Baish will be the sixth deepest producer in the United States and the deepest oiler in the Permian Basin. Flowing production has been developed in the deep wildcat in the Maljamar area of Lea County. In 5 hours well flowed 104 bbl. of 47°-gravity oil through open 2-in. tubing. Top of the Devonian was called at 12,500 ft. Well was drilled to 13,568 ft. and casing set at 13,557 ft.

PLOUGHING FOR OIL PLANT

On the marshy Isle of Grain in southern England, some 750,000 cubic yards of soil, poor for farming, are being moved in the construction of Britain's latest oil plant. On this site, Anglo-Iranian's fourth refinery in the United Kingdom is rapidly taking shape. By 1953 it will be in full operation with a production capacity of over 80,000 barrels a day; and one more stage will have been completed in Anglo-Iranian's world-wide program of refinery expansion.

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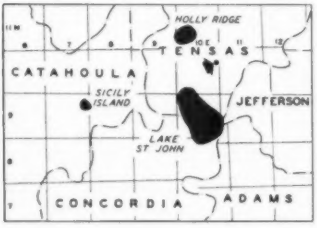
Louisiana-Arkansas

Official Completion Made On Tensas Wildcat Oiler

SHREVEPORT.—Helena probably will be the name given to the new field discovered by Atlantic Refining Co. at H. T. Goldman, NE SW 12-10n-10e, new strike in Tensas Parish.

Official completion was January 29. Well flowed 75 bbl. of 40.2°-gravity oil daily through 17/64-in. choke on tubing. The



gas-oil ratio was 675:1. Well flowed 100 bbl. daily on company test.

Production is from Tuscaloosa sand, which was perforated from 8,912-27 ft. Hole bottom is 9,030 ft. with 5½-in. casing cemented on bottom.

Geological markers on the new discovery include (working from elevation of 75 ft.) Cockfield 1,117 ft., Cook Mountain 1,722 ft., Sparta 1,924 ft., Cane River 2,879 ft., Wilcox 3,292 ft., Tuscaloosa 8,204 ft., and Tuscaloosa sand 8,916 ft.

Atlantic is now rigging up rotary tools at 1 Sarah F. Butts, C SW NE 12-10n-10e, a diagonal northeast offset to the discovery, for a confirmation test.

Stanolind Oil & Gas Co. is making ready to put the 1 Nebo Co. on the pump. The wildcat is located in Bossier Parish, 15-23n-12w. Well has been completed for an estimated 20 bbl. of oil daily from the Tokio. Previous tests in the Smackover and Pettit showed no commercial production of any kind. Total depth is 11,262 ft. Nearest Tokio production is about 1½ miles away in the North Carterville section.

An official gage of 146.34 bbl. 46°-gravity oil has been announced for M. T. Halbouty and Greyhound Drilling Co. 1 Dr. T. B. Tooke, on the southeast flank of Pine Island, 18-20n-14w. Wildcat flowed on packer and through a 10/64-in. choke from perforations between 3,706-16 ft. in the Kilpatrick sand of the Rodessa zone. Wildcat is a new Kilpatrick sand discovery in the Pine Island area, Caddo Parish.

Arkansas.—In Union County Martin Wunderlich is testing the 1 Reynolds-Gammill Lumber Co., SW NW 36-16s-17w; testing a flow of gas, oil and salt water from perforations at 6,428-31 ft. Gas and salt water were also tested from perforations at 6,425½-28 ft. Two previous tests, 6,421-22 ft. and 6,423-25½ ft., tested dry. Total depth is 6,588 ft.

LOUISIANA WILDCAT SUCCESSES

Caddo Parish: M. T. Halbouty 1 T. B. Tooke, C NW NW 18-20n-14w, flowed 146 bbl. 46°-gravity oil from Rodessa at 3,706-16 ft., TD 5,047 ft. (New pay in Caddo pool.)

Tensas Parish: Atlantic Refining Co. 1 H. T. Goldman, 1,947 ft. N and 2,012 ft. E SWc 12-10n-10e, flowed 58 bbl. 40°-gravity oil from Tuscaloosa at 8,912-27 ft., TD 9,030 ft. PBTD 8,967 ft.

LOUISIANA WILDCAT FAILURE

Sabine Parish: Placid Oil Co. et al 1 J. D. Woolworth, 2,058 ft. S and 825 ft. E NWc 10-7n-10w, dry, TD 7,015 ft.

ARKANSAS WILDCAT FAILURES

Ouachita County: C. A. Hilburn et al 1 Mary Slaughter, 500 ft. N and 330 ft. E SWc SE SE 14-14s-19w, dry, TD 2,263 ft.

Union County: Murphy Corp. 1 Chester, 720 ft. S and 627 ft. W NEc 32-19s-17w, dry, TD 9,938 ft.

Eastern Texas

Well Confirms Big Mineral Creek Field

DALLAS.—Shell Oil Co. 2 Q. Little, William Allen Survey, A-15, 2 miles west of Hagerman, was completed as a confirmation well in the Big Mineral Creek field of Grayson County.

Final gage was 321 bbl. of 37°-gravity oil in 14 hours, flowing through ¼-in. choke from casing perforations at 5,125-93 ft.

Northwest of Sherman, Standard Oil Co. of Texas 1 Baker, A. Humes Survey, was drilling in shale at 8,002 ft.

The Texas Co. 3 Barnes, extension location to the Sandusky field, Stickney Survey, recovered 5,190 ft. of gas, 20 ft. of free oil, and 45 ft. of oil and gas-cut mud on drill-stem test from 6,886-6,900 ft., and was drilling ahead.

B. G. Byars and E. L. Kurth 1-A Angelina County Lumber Co., Angelina County wildcat which last week reported good oil shows, plus a flow of oil on drill-stem test, developed salt water on a flow test of open hole at 3,938-40 ft. It was testing at last report.

Final gage was taken on Carter-Gragg Oil Co. 1 Kent, Navarro County Pettit discovery. Flowing through 12/64-in. choke, the well made 43 bbl. of oil, with some water, from perforations at 6,832-42 ft.

In Limestone County, Byrd Frost, Inc. 1

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Maddox, P. Valera Survey, was waiting on potential. A test on perforations at 4,920-30 and 5,540-70 ft. made an estimated 4,000,000 cu. ft. of gas a day through 20/64-in. choke.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Anderson County: A. O. Phillips 1 J. P. Hickman, E. M. Rogers Sur., dry, TD 10,175 ft., Woodbine 4,870 ft., Buda 5,800 ft.

Fannin County: J. E. Harris 1 Sam Rayburn, R. Kerr Sur., dry, TD 756 ft.

Kaufman County ROD Oil Co. 1 R. A. Piper, R. Sowell Sur., dry, TD 5,503 ft., Woodbine 2,776 ft.

Leon County: American Liberty Oil Co. 1 Leon Ranch, A. Penn Sur., dry, TD 6,000 ft., Pecan Gap 4,285 ft., Woodbine 5,990 ft.

Upshur County: Bobby Manziel 1 R. E. Spencer, J. Trimble Sur., dry, TD 8,410 ft.

South Louisiana

Oiler Seems Assured for Little Lake Gas Field

NEW ORLEANS.—Little Lake gas field in Jefferson Parish seems assured of an oiler at Humble Oil & Refining Co. 1 L.L.&E. "F," which is located southeast of the shut-in gas well in the field. Operators conducted a 5-hour drill-stem test at 11,274-79 ft., with recovery being an estimated 244 bbl. of 36.8°-gravity oil daily. Flow was gaged through $^{1}/_{8}$-in. choke under tubing pressure of 2,700 psi. These perforations were squeezed and operators will perforate a section around 11,288 ft. for more production tests.

The Texas Co. has completed its wildcat try in the Shell Point area of Lake Borgne, Orleans Parish, for 129 bbl. of 46°-gravity oil daily. The well is producing from perforations at 9,900-25 ft. Tubing pressure was 1,200 psi. Hole is bottomed at 10,084 ft. with 7-in. casing cemented at total depth.

Testing operations are under way at The California Co. 1 State Lease 1958, wildcat in the Battledorf Reef area off Plaquemines Parish. The well was drilled to total depth of 10,000 ft. and electric log was run to that depth. Operators plugged back to 8,482 ft. and perforated for production tests at 8,211-16 ft. After running $2^{1}/_{2}$-in. tubing, the well was opened but did not flow. Testing will continue.

Nelson Bunker Hunt has staked location for a wildcat east of production in Chalkley field in Cameron Parish. Well is 1 The Lacassine Co., 9-12s-5w, and will be drilled to 11,500 ft. Drill-site is on a 20,000-acre farmout from Sinclair Oil & Gas Co.

Two miles north of Atchafalaya Bay in St. Mary Parish, The Texas Co. will drill 1 C. A. Canty et al., 1-18s-11e. The proposed venture is a 12,500-ft. exploration.

W. T. Burton has plugged and abandoned 1 C. M. Thibodeaux Hole 2, 12-16s-13e, wildcat in Assumption Parish. Electrical survey was run before hole was abandoned, with no shows indicated. Hole was bottomed at 13,501 ft.

In the same parish, Sun Oil Co. and Burton have abandoned location for 1 Dreibhaltz et al., proposed 13,500 ft. wildcat in 12-16s-13e. Location was one-half mile east of Lake Paloudre.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Lafourche Parish: Gas-condensate discovery—Callery & Hurt 1 Caldwell Sugars, 19-14s-16e, TD 13,690 ft., perf. 13,623-39 ft., IP 221 bbl. condensate per day, 14/64-in. choke, 48.7° gravity, TP 2,587 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Allen Parish: Niloco Co. and Bel Oil Corp. 1 Edgewood Land & Logging Co., 19-6s-7w, dry, TD 7,134 ft.

Beauregard Parish: Hassie Hunt Trust 1 Sam R. Tritico Est., 27-3s-9w, dry, TD 9,013 ft.

North Central Texas

Testing Continues at Montague County Strike

WICHITA FALLS.—Exploration work in Montague County had one discovery flowing oil and another recovering clean oil on a drill-stem test.

The flowing well was Hiawatha Oil & Gas Co. 1 S. L. Caswell, Block 17, Titus CSL, 5 miles east of Sunset. Perforations in the lower conglomerate from 6,210-20 ft. produced 12 bbl. of 39°-gravity oil an hour through 1/4-in. choke. Testing continued.

Hiawatha was reported ready to start an east offset to the strike.

George S. Engle 1 Fenoglio et al, J. M. Collier Survey, 4 miles northeast of Montague, drill-stem tested in the Caddo conglomerate at 6,401-11 ft. Recovery in 2 hours was 490 ft. of oil and 30 ft. of oil-cut mud. It was to drill ahead to test other conglomerate zones.

British-American Oil Producing Co. had a confirmation well in prospect at its 2 W. B. Johnson, northwest offset to the Caddo discovery, in Foard County.

A core from 6,250-59 ft. recovered 9 ft. of lime with oil shows and a test of that interval had gas in 20 minutes and recovered 900 ft. of oil, 180 ft. of oil and gas-cut mud, and 60 ft. of salt water. Further shows were cored from 6,259-69 ft. and a test of the section was to be made.

Location of the 2 Johnson is 32-2-TE&L, and nearly 1/2 mile north of the discovery which made a 171-bbl. well.

A new discovery and locations for four new wells was reported for Coleman County, 2 miles south of Glen Cove. A. M. Howsley 1 C. F. Sappington, Section 12, T&NO, flowed 306 bbl. of oil a day through 16/64-in. choke on completion test. Pay was the Jenning sand at 3,419-35 ft. Howsley had four more tests scheduled for the area.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT SUCCESSES

Jones County: Cities Service Oil Co. 120-1 Flat Top, Sec. 120, BBB&C, TD 2,430 ft., elev. 1,656 ft., pay 2,416 ft., IP 127 bbl. 38°-gravity oil, 8/64-in. choke, TP 40 psi., GOR 843 cu. ft.

Stephens County: Hamilton Bros. 1 Scott Lipe, 71-6-T&P, TD 1,878 ft., elev. 1,501 ft., pay 1,665 ft., IP pumped 18 bbl. 40°-gravity oil.

Young County: Cox Drilling Co. 1 J. L. Lewis, Sec. 13, TE&L Sur., TD 4,789 ft., Caddo perf. 4,355-73 ft., IP pumped 77 bbl. 41°-gravity oil, GOR 1,500 cu. ft.

Hanlon-Boyle 1 Bellamy, Sec. 728, TE&L Sur., TD 3,849 ft., Caddo pay 3,830 ft., IP pumped 30 bbl. 41°-gravity oil, GOR 200 cu. ft.

W. T. Roberts 1-B Jeffery, D. Brown Sur., A-16, TD 4,760 ft., pay 4,726 ft., IP 864 bbl. 45°-gravity oil, 16/64-in. choke, TP 600 psi.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Bridwell Oil Co. 1 Eva Dyous, J. Ostane Sur., A-333, dry, TD 3,985 ft.

R. H. Busby 1 J. C. Clement, TE&L Sur. 2,491, Blk. 2, dry, TD 1,502 ft.

R. H. Busby 1 J. A. Young, Sec. 2,432, TE&L Sur., dry, TD 1,497 ft.

T. B. Cochran 4 C. L. Abercrombie fee, Blk. 23, Harris Division, Club Ranch, dry, TD 1,500 ft.

Brown County: Mrs. Bessie Kenner 1 R. H. Mauldin, SA&MG Sur. 1, dry, TD 1463 ft., elev. 1,580 ft., Fry sand 1,451 ft.

Clay County: Tom B. Medders and J. Newton Huff 1-A Howard, Blk 40, T. J. Belcher Subd., dry, TD 6,132 ft.

Coleman County: Gilchrist Drilling Co. 1 G. K. Redding, Wm. Woolsey Sur. 294, dry, TD 2,571 ft.

P. P. Langford 1 J. B. McCord, Sec. 12, G. L. Roberts Sur., dry, TD 3,621 ft.

Guy and Louis Mabee 1 O. L. De Prang, Sec. 4, W. H. Sewell Sur., dry, TD 3,928 ft.

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H. F. Rachal 1 C. B. Haynes, Sec. 79, J. L. Dindell Sur., dry, TD 1,030 ft.
Cooke County: R. B. Hollandsworth 1 J. A. Becker, Blk. 10, Geo. Ivy Sur., dry, TD 2,127 ft.
Harry F. Pappas 1 T. Miller, Blk. 15, Geo. Ivy Sur., dry, TD 2,727 ft.
W. F. & W. O. Russell 1 G. E. Shasteen, Morris Sur., A-697, dry, TD 2,542 ft.
Snuggs & Neal, Inc. 1 Dora Smith, J. C. McElroy Sur., A-712, dry, TD 4,800 ft.
Eastland County: A. E. Frazier 1 Carl Stroebel, 117-3-H&TC, dry, TD 4,010 ft., Caddo 2,948 ft., Ellenburger 3,986 ft.
Fisher County: RHK Drilling Co. 1 A. A. McBeth, Sec. 119, H&TC, dry, TD 5,430 ft., elev. 1,851 ft., Dothan 3,080 ft., reef 5,405 ft.
Skelly Oil Co. 1 B. C. Carriker, 74-1-HT&B, dry, TD 6,082 ft., elev. 1,960 ft., Canyon sand 4,751 ft.
Haskell County: Joseph M. Wilson 1 W. S. Taylor, 73-75-Red River CSL, dry, TD 5,758 ft.
Jack County: Herbert Herff 1 W. R. Johnson, J. J. Miller Sur., A-2,209, dry, TD 5,903 ft.
W. W. Whiteman, Jr., 1-A J. W. Kee, SPRR Sur., A-482, dry, TD 2,225 ft.
Jones County: Grisham-Hunter Corp. 2 J. J. Steele, on line between Sections 38 and 49, Harrison CSL, 334, dry, TD 3,038 ft., Gunsite 2,885 ft., King sand 3,020 ft.
B. C. McBride 1 Basland, Sec. 180, BBB&C dry, TD 2,053 ft.
Rancho Oil Co. 1 City of Hamlin, Lge. 336, McMullen Sur., dry, 5,735 ft., Flippen 2,920 ft.
G. B. & J. H. Rice 1 Simmons, 91-1-BBB&C, dry, TD 3,031 ft.
Woodley Petroleum Co. et al 1 Wiley Norwood, 18-15-T&P, dry, TD 4,580 ft.
Palo Pinto County: E. C. Holt 1 Pat Dalton, C. A. Dalton Sur., A-1,555, dry, TD 1,778 ft.
Zenith Petroleum Co. 1 H. C. Gilmore, Geo. Dedrick Sur., A-75, dry, TD 3,008 ft.
Shackelford County: R. J. Zonne 1 Holstein, 38-14-T&P, dry, TD 1,848 ft.
Stephens County: S. Caprito 1 Henry Compton, 20-7-T&P, dry, TD 4,233 ft., elev. 1,295 ft., Ellenburger 4,164 ft.
DeGrazier & Wagner 1 H. L. Brown, 2,956-7-T&P, dry, TD 3,510 ft.
L. E. Gilbreath 1 L. M. Crowley, 16-6-T&P, dry, TD 2,186 ft.
Taylor County: Bay Petroleum Co. 1 H. U. Brummond, Cozart Subd., Guadalupe CSL, dry, TD 4,010 ft.
Young County: R. W. Darden Trustee 1 J. R. Barnett, Blk. 186, TE&L Sur., dry, TD 1,041 ft.
Reno Oil Co. 1 Barron, Sec. 1,903, TE&L Sur., dry, TD 3,711 ft.

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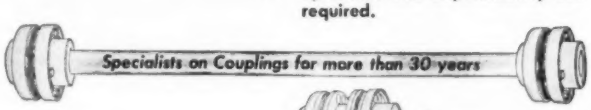

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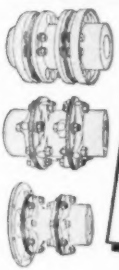

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Mississippi

Adams County Has Good Wilcox Strike in Prospect

JACKSON.—B. Serio and J. Paul Ratcliff, Jr., have prospects of a good Wilcox strike in Adams County approximately 2 miles east of Kingston field. Venture is 1 Francis Geddes, 25-5n-1w, which logged approximately 23 ft. of oil sands in the McKittrick and Baker zones. Electric log and sidewall samples indicated oil sand in the McKittrick zone at 6,320-23 ft. and 6,335-43 ft. as well as in the Baker zone at 6,377-81 ft. Another 3 ft. of sand at 6,384-87 ft. is considered questionable. Operators have run casing to 6,425 ft. and are preparing to perforate for testing.

In Rankin County, considerable interest has been created at Lion Oil Co. 2 Denkmann, 22-7n-4e, where a show was encountered in dolomitic sand at 15,585-15,640 ft. This test had top of Buckner at 14,475 ft. and to present depth there has been no definite Smackover. Recovery from core at 15,585-15,615 ft. was 24 ft. of brown, medium to coarse grained, subangular to round, dolomitic sand. Very little fluorescence could be detected. There was no salty taste. Porosity was 4 to 8 per cent and permeability averaged 150 md. per foot with the highest being 950 md. Coring has been continued to present depth of 15,658 ft., with recovery being the same type of sand. It is not known at present if drill-stem test will be attempted in this sand.

In Alabama, Humble Oil & Refining Co. has staked location for the first development well in the newly discovered Pollard field. Venture is 1 Lillie Congleton et al, SE NW 17-1n-9e, which is 1 mile east and one location south of the discovery well. This test has set surface casing and is reported to be drilling below 1,190 ft.

It is reported that Humble is installing pumping equipment at 1 H. C. Spears, 27-1n-6e, Amite County. On swabbing tests, the well made 18 bbl. of oil plus 315 bbl. of water per day.

At South White Apple field, Franklin County, Gammill-Cashion 2 Anderson, 3-5n-1e, east offset to the field discovery, has encountered an oil sand at 6,276-92 ft. as indicated by electric log and sidewall samples. It is thought that at least 14 ft. of this is net effective oil sand and should make the best well in the field. The company has set pipe and are preparing to test.

MISSISSIPPI WILDCAT FAILURES

Jasper County: Fred Mellen-J. F. Michael 1 Alexander Est., 21-1n-11e, dry, TD 6,710 ft.
Jefferson County: Sunnyland Contracting Co. et al 1 Brady Smith, 30-8n-2e, dry, TD 6,615 ft.
Pearl River County: Rosser & Pendleton, Inc., 3 Crosby Lumber Co., 14-1n-17w, dry, TD 9,243 ft.
Wilkinson County: Clements-Latimer-Vaughn-Ballew 1 M. L. Robinson, 29-2n-1e, dry, TD 8,504 ft.

ALABAMA WILDCAT SUCCESS

Escambia County: Oil discovery "Pollard"—Humble Oil & Refining Co. 1 A. W. Moye, 18-1n-9e, TD 5,983 ft., lower

Tuscaloosa 5,944-49 ft., IP 324 bbl. oil per day, ¾-in. choke, TP 300 psi., 30° gravity.

ALABAMA WILDCAT FAILURE

Blount County: Ben Stein 1 Ison-Littleton, 4-11s-1e, dry, TD 871 ft.

Kansas

Gove County Wildcat Shows for Producer

THE second attempt to open production in the area about 4 miles southwest of the Coberly pool, in south central Gove County, is being made where Skiles Oil Corp. is testing good showings encountered in the upper part of the Mississippian at its 1 Lundgren, NE NE NW 30-14-29. A 60-minute drill-stem test of the prospective pay zone made before casing was run yielded 60 ft. of clean oil with 300 ft. of muddy oil and 660 ft. of gas. Interval tested was at 4,304-26 ft. with top of the Mississippian at 4,303 ft. (—1,675 ft.). Casing was run through the pay to 4,326 ft. (total depth).

Location of the well is slightly more than ½ mile west of a well, drilled last year by Glen Nye, which produced a small amount of oil with water on swabbing tests in the same zone but which eventually (last September) was abandoned as uncommercial. It had the Mississippian at 4,262 ft. (—1,673 ft.), and was drilled to 4,288 ft.

Virginia Drilling Co. has a prospective new pool-discovery well in northern Kingman County where it 1 Rayl, C S½ NW NW 15-27-7, is testing promising oil showings encountered in the upper part of the Mississippian, topped at 3,815 ft. (—2,290 ft.). Approximately 290 ft. of heavily oil-cut mud was recovered in a 60-minute drill-stem test of an interval at 3,827-43 ft. Casing, run to 3,841 ft., has been perforated opposite the above interval. The location, 3½ miles northeast of Kingman, is 1½ miles northeast of the abandoned Kingman pool.

E. K. Cary 1 Maes, SE SW SE 26-17-8, a wildcat located a mile east of the Edwards pool in southern Ellsworth County, is being put on the pump following a swabbing test which recovered 29 bbl. of oil during a 2-hour period. Production showed only a trace of water. Pay zone is Arbuckle lime, topped at 3,341 ft. (—1,582 ft.), and drilled to 3,357 ft. Hole is open below 3,354 ft.

KANSAS WILDCAT SUCCESSES

Osborne County: Anderson-Prichard Oil Corp. 1 Ruggles, NW NW NW 23-10s-15w, pumped 193 bbl. oil from Sooy at 3,394-3,410 ft., TD 3,557 ft.

Rice County: Magnolia Petroleum Co. 1 Fair, SW SW SE 15-21s-10w, pumped 11 bbl. oil from Sooy at 3,358-68 ft., TD 3,445 ft. PBTD 3,375 ft. (opens Fair pool).

Rooks County: Deep Rock Oil Corp. 1 Gosselin, SW SW SW 12-8s-20w, pumped 55 bbl. oil from 3,204-14 ft., TD 3,492 ft. PBTD 3,245 ft. ((opens Hillside pool).

KANSAS WILDCAT FAILURES

Cowley County: Aladdin Petroleum Corp. 1 Lemert, NE NW SW 11-34s-4e, dry, TD 3,603 ft.

Ellis County: M. Sitrin et al 1 Sack, SW SW NE 13-13s-19w, dry, TD 3,711 ft.

Geary County: F. G. Holl et al 1 Iseli, NW NW SE 24-12s-7e, dry, TD 2,656 ft.

Graham County: A. F. Keating 1 Ridgley, SW SW SW 6-7s-21w, dry, TD 3,810 ft.

Harvey County: J. P. Gaty et al 1 White, NE NE NW 3-22s-2e, dry, TD 2,724 ft.

Hodgeman County: J. Lindas Oil, Inc. 1 Clutter, NE NE SW 20-22s-26w, dry, TD 4,635 ft.

K. A. Ellison 1 Baldrey, NW NW SE 4-23s-22w, dry, TD 4,490 ft.

Norton County: H. Gore 1 Bullock, NE NE NW 22-4s-23w, dry, TD 3,857 ft.

Phillips County: Lewis Drilling Co. 1 Merk-

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elin, NW SE NW 22-2s-19w, dry, TD 3,560 ft.

Victor Drilling Co. 1 Barber, SE SW SE 30-18s-18w, dry, TD 3,475 ft.

Dozier 1 Engelland, SW SE NW 19-19s-7w, dry, TD 3,440 ft.

Rooks County: E. Madden et al 1 Shaw, SE SE NW 11-6s-19w, dry, TD 3,600 ft.

Sumner County: National Associated Petroleum Co. 1 Zimmerman, SE SW SE 32-31s-1e, dry, TD 4,121 ft.

Trego County: Armer et al 1 Weisbeck, SW SW SE 33-11s-25w, dry, TD 4,725 ft.

Southwest Texas

Gas-Distillate Discovery Seen for Rhode Gas Field

CORPUS CHRISTI.—On the southeast flank of the shallow Rhode gas field, Jake L. Hamon apparently has a gas-distillate discovery at 1 Rhode, Section 56, Alfred Spalding Survey, Abstract 94. A 30-minute drill-stem test in the Wilcox at 7,489-7,504 ft., recovered 45 ft. of distillate with bottom-hole flowing pressure of 3,225 psi. Operator is presently coring below this depth. Two previous drill-stem tests in the Wilcox at 7,466-74 ft. and 7,474-89 ft. recovered distillate. Gas production in this area is found around 1,700 ft.

Approximately 3½ miles southeast of Charlotte in Atascosa County, Humble Oil & Refining Co. has completed a small oil discovery at C-2 E. J. Pruitt, Fabricus Reynolds Survey 51. The well pumped 5.53 bbl. of 36.9°-gravity oil daily.

In San Patricio County, La Gloria Corp. 1 N. L. Wilson, Section 66, G. H. Paul Subdivision, flowed gas and distillate on drill-stem test in the Frio at 5,224-33 ft. Operator ran tubing and is still testing through ¼-in. choke.

Four miles northeast of Bandera in Bandera County, H. L. McBride has staked location for 1 McBride, a 4,000-ft. wildcat in J. E. Davenport Survey, Abstract 2,012.

Meanwhile, in the same county, Mikton Oil Co. 1 W. F. Stelzer, wildcat just west of Vanderpool which reportedly had shows of oil on drill-stem test around 5,100 ft., was drilling ahead after running log to 7,500 ft.

Cameron County gained a new wildcat which will be drilled by Union Oil Co. of California. Venture is 1 Mellie Esperson, and has a projected depth of 11,500 ft. Location is 3 miles southwest of Port Isabel in Share 2, San Martin Grant. This is in an area where Pure Oil Co. previously has carried out an extensive exploration program, having drilled six dry holes in the immediate vicinity.

Elmer F. Schmidt et al have abandoned 1 N. G. Dinsmoor, Kerr County wildcat, at total depth of 4,882 ft. Drill-stem test at 4,509-79 ft. recovered 159 ft. of mud slightly cut with gas. Top of the Ellenburger was called at 4,511 ft.

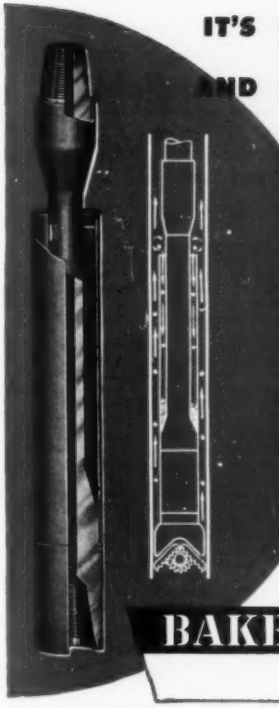
SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT SUCCESSES

Aransas County: New pay at Salt Lake—Sun Oil Co. 3 Copano Bay State Tract 75, in State Tract 75 of Copano Bay, TD 8,673 ft., perf. 7,830-40 ft., IP 144 bbl. oil per day, 9/64-in. choke, 43.2° gravity, TP 1,340 psi.

Jim Wells County: Oil discovery—The Texas Co. 2 C. Hoelscher, "Los Presenos de Abajo" Apolinario de la Garza Grant, A-171, TD 5,638 ft., perf. 5,053-63 ft., IP 83 bbl. oil per day, 41.8° gravity, ⅛-in. choke, TP 550 psi.

Nueces County: Oil discovery—Gulf Plains Corp. 1 W. B. Mohle, George Paul Subd. of Driscoll Ranch, Sec. 34, TD 8,604 ft., perf. 8,319-93 ft., IP 29 bbl. oil per day, ⅞-in. choke, 48.2° gravity.

Webb County: Gas discovery—J. Arthur Lundell 1 Garcia-Villareal, Sur. 720, TD 2,908 ft., perf. 2,432-50 ft., IP 20,000,000



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SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Aransas County: The Atlantic Refining Co. 1 J. F. Cloberdants, Anselmo Bergara Sur., A-14, dry, TD 7,375 ft.

Atascosa County: Pegg Bros. & Co. 1 W. W. Farran, Francisco de la Garzo Sur. 46, A-277, dry, TD 2,304 ft.

Plymounth Oil Co. 1 Bob Hindes et ux, Thos. Orr Sur., A-241, dry, TD 8,818 ft.

Duval County: Blanco Oil Co. et al 1 D. Gottlieb et al, B. Elizando Sur., Sec. 570, dry, TD 4,500 ft.

Edwards County: Louis Marbee Co. 1 Wheat Bradford, HE&WT RR Sur., Sec. 15, dry, TD 3,855 ft.

Gonzales County: Doughty, Bailey & Cox 1 Ben Weber, Geo. W. Petty Sur., dry, TD 5,554 ft.

Jim Wells County: Geo. W. Graham 2 C. W. Ragland, Los Presenos de Abajo Grant, Share 3, Par. A, dry, TD 3,650 ft.

Kinney County: Fish Production Corp. 1 Postell, Sec. 620, Salitha Banks original grantee, dry, TD 5,375 ft.

McMullen County: Hassie Hunt Trust 1 R. B. Lowe Est., J. Eldridge Sur. 1363, A-182, dry, TD 6,010 ft.

Milam County: W. F. Glenn 3 O. Neal, Jose Leal Sur., dry, TD 1,538 ft.

San Patricio County: Renwar Oil Corp. 1 Hogg Est., T. T. Williamson Sur., dry, TD 10,015 ft.

Starr County: Continental Oil Co. A-123 T. B. Slick Est., Sec. 531, 19 mi. NE of Rio Grande City, dry, TD 6,415 ft.

Travis County: Cook & Maizel 1 W. H. Bright, Thomas B. Westbrook Sur., dry, TD 1,616 ft.

Wilson County: G. R. Schimel 1 Henry E. McDaniel, J. B. Niestra Sur., dry, TD 2,885 ft.

Zapata County: Mike Florence, Jr., 1 Everisto Guiterrez, Jr., Charco de la India Grant, dry, TD 2,069 ft.

Pierce Texita Oil Co. 1 Filiberto Pena Est., El Pedernal Grant, dry, TD 1,510 ft.

Canadian Fields

Millet Area Venture Shows Gas and Some Oil

CALGARY.—Trinidad Leaseholds (Canada), Ltd., has discovered natural gas and found a small showing of oil in the Lower Cretaceous at an exploratory venture in the Millet area, around 5 miles southeast of Kavanagh area D2 oil production and 3½ miles south of the Cretaceous gas discovery drilled by American Northland and associates.

The new gasser, located on a quarter section farmout from Imperial Oil, Ltd., is continuing coring and testing operations in the Cretaceous, priliminary to heading down in search of its Devonian obectives.

The well is Trinidad 1 Millet, on LSD 14 13-48-25w4. Cretaceous test from 4,448-4,468 ft., gave up a recovery of 90 ft. of gassy oil-cut mud, while test from 4,468-4,688 ft., gave a natural gas flow to the surface in 5 minutes, at estimated maximum rate of 2,000,000 cu. ft. daily. Recovery was 15 ft. of mud, no oil or water.

The Millet gas discovery well is located 1½ miles north of a New British Dominion wildcat abandonment that was drilled some time ago. Several Canadian independents have acreage interests in the vicinity of the gas strike, in addition to Trinidad and Imperial.

The Pacific Petroleums Group is heading down for its lower objectives at the first two follow-up drillers in the vicinity of the Fort St. John oil discovery well in northeast British Columbia. One of those ventures found a moderate flow of natural gas in the Gething sand, while the other well found that section unproductive.

Pacific 3 Fort St. John, located about 6½ miles northeast of the discovery, drill-stem tested the Gething interval 3,264-84 ft. for 1½ hours and received a flow of gas in 4 minutes, at average rate 360,000 cu. ft. daily and a recovery of 30 ft. of mud, no water. Crew is now continuing to drill below 3,542 ft.

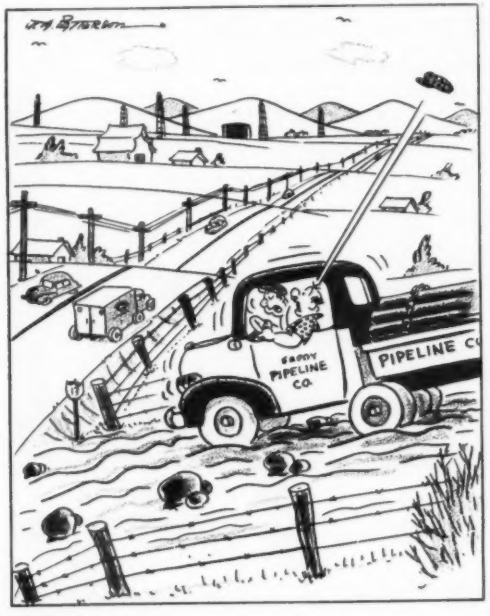
Pacific 4 Fort St. John, 3 miles due north of the discovery, tested in the Gething, but did not receive any gas flow or fluid recovery.

The discovery well, Peace River-Allied 1 Fort St. John, has a service rig installed, but production testing will not be resumed until weather conditions moderate in that area. This well indicated oil discovery in the Permo-Pennsylvanian last November, when drill-stem test around 5,650 ft. gave a recovery of 900 ft. of light crude oil plus mud and salt water.

Natural gas has been struck at an exploratory venture in the North Brazeau area of West Central Alberta, around 155 miles northwest of Calgary. The well, Plateau-Chungo-Tartan 1 Cedar, found its gas in the Blairmore formation, after penetrating about 138 ft. of that horizon.

The gas strike was made at around 4,966 ft., as crew was drilling ahead. The bit was being pulled out of the hole, and natural gas blew some of the drilling mud to the surface and crew immediately pumped baroid down the hole to kill the gas flow. Potential of the well is not as yet determined, as no drill-stem tests have been run. Company officials, in reporting the above details, stated that crew will continue to pump baroid down the hole in an attempt to keep it under control, and plan to rathole in an effort to prepare the hole for a drill-stem test.

The well is located on LSD 7 23-44-19w5, about 33 miles northwest of Nordegg town. Drilling was started at this wildcat by



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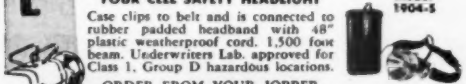

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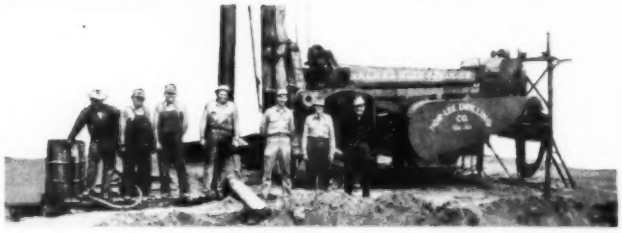

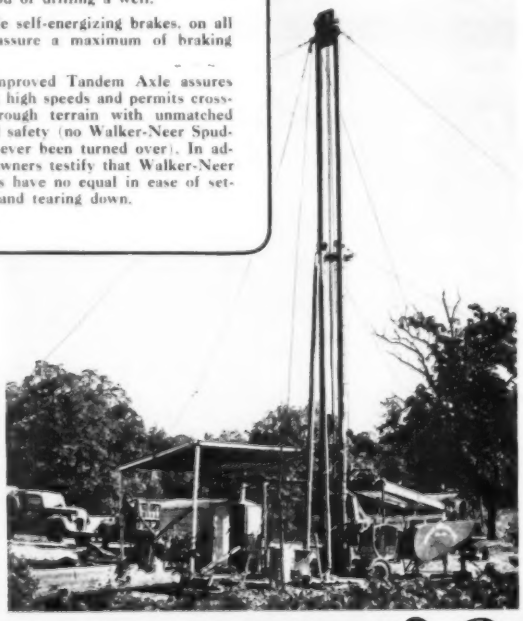

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Chungo Oil Holdings, Ltd., and Plateau Petroleums, Ltd. Tartan Petroleums, Ltd., and Cedar Oils, Ltd., joined the first group to deepen the well. Hole is scheduled to go as a Madison test.

CANADIAN SUCCESSFUL WILDCATS

Texaco A-1 Bonnie Glen, LSD 3 20-47-27w4, TD 7,120 ft., IP 240 bbl. per day through 12/64-in. choke.

Union 1 Mellowdale, LSD 10 21-60-3w5, TD 6,640 ft., capped gas well.

CANADIAN WILDCAT FAILURE

British-American Oil Producing Co.-Cities Service 1 Notikewin, LSD 1 16-92-2w6, TD 7,928 ft.

California

Imperial County Has Another Failure

LOS ANGELES—Another failure was recorded by The Texas Co. in its extensive exploratory campaign directed toward establishing oil production in Imperial County. The company, however, was preparing to start a third test in the Superstition Mountain area, 20 miles southeast, and probably will drill at least one other test before summer begins.

The abandoned wildcat was 1 Pure (NCT), in 31-11s-10e or about 40 miles northwest of its first test west of Calexico on the Mexican border. No. 1 Pure was abandoned at a depth slightly below 4,400 ft. whereas the first wildcat, 1 Jacobs, was abandoned at 7,505 ft. The new test will be its 1 Stipek, in SW SW 4-14s-12e, or about midway between these two failures.

The Texas Co., after spending more than 2 years in geophysical work and piecing together of lease blocks, started the first wildcat last September. With holdings scattered from the border north into Riverside County, and estimated to total approximately 200,000 acres, the company is expected to thoroughly test this remote area.

Developments in the Los Angeles region included the addition of a third pay zone at the Castaic Junction field and a new deep zone discovery at Seal Beach. The former was registered by Humble Oil & Refining Co. 8 Newhall Land, which flowed at the rate of 575 bbl. daily through perforations in 155 ft. of Mohnian oil sand topped at 10,722 ft. From the standpoint of sand thickness and permeability the new zone promises to be the field's best.

The Seal Beach discovery was recorded by Continental Oil Co.'s deep test, 62 Bixby, in SW SW 2-5s-12w. Drilled to 12,162 ft., the test was plugged back to 10,870 ft. and 9⅝-in. casing set at 7,995 ft. When swabbed between 7,995-9,943 ft. the new deeper zone produced at the rate of 250 bbl. of oil daily. Completion was held up pending installation of pumping equipment. No. 62 Bixby on formation tests several months ago indicated the 7,723-7,894 ft. interval also would produce oil.

In the northern region's Contra Costa County, John Balwdin, operator, was preparing to redrill a Pittsburg wildcat abondoned earlier this year. The wildcat was 1 Baldwin-Soite in 17-2n-1w, abandoned at 5,480 ft. after topping the Capay at 4,000 ft. Hole has been plugged back to 1,800 ft. and will be redrilled to about 5,300 ft. to test oil shows in the original hole.

In Alameda County, The Texas Co. has staked final location for a test 3 miles southeast of Livermore. It will be 1 Hancock-Wente in 27-3s-2e. The company was preparing to abandon its 1 Steele in the Pescadero area of San Mateo County, 36-7s-5w, after drilling to 8,025 ft. In the Vaca Mountains area of Napa County, Western Gulf Oil Co. was drilling ahead at 10,900 ft. at its 1 J. N. Knowles in 28-9n-3w.

On the extreme eastern end of Cuyama Valley, Richfield Oil Corp. was preparing to start its third test of the Caliente Unit. Site of No. 3 will be in 13-10n-25w, about ¼ mile southeast of No. 2 and ¾ mile southwest of No. 1. The area is about 10 miles northeast of the South Cuyama field, which for the first time since its discovery almost 3 years ago is currently without a drilling well. With some 235 producers completed, South Cuyama is just about completely developed.

CALIFORNIA WILDCAT FAILURES

Fresno County, Coalinga area: H. R. Sumpf 1 Hughes-Gribble, 10-21s-15e, dry, TD 7,394 ft., elev. 665 ft.

Imperial County, San Felipe Hills area: The Texas Co. 1 Pure (NCT-1), 31-11s-10e, dry, TD 4,414 ft., elev. 162 ft.

Kern County, Salt Creek area: E. A. Bender 5 Sheep Springs, 17-29s-21e, dry, TD 3,572 ft., elev. 870 ft.

Salt Creek area: Hetman-Canning 1 "Well," 9-11n-18w, dry, TD 741 ft., elev. 1,015 ft.

Kings County, Dudley Ridge area: Standard Oil Co. 32 Wishon-Watson Co., 7-23s-20e, dry, TD 3,350 ft., elev. 197 ft.

Los Angeles County, Whitney Canyon area: Continental Oil Co. 1 Phillips, 6-3n-15w, dry, TD 8,253 ft., elev. 1,650 ft.

Monterey County, Peachtree Valley area: Union Oil Co. 2 Mee, 16-20s-11e, dry, TD 4,187 ft., elev. 1,775 ft.

Pancho Rico area: Shell Oil Co. 25-5 Helm-Orradre, 5-22s-11e, dry, TD 2,452 ft., elev. 1,310 ft.

Los Lobos area: The Texas Co. 1 Alice Garrissere Two, 24-22s-9e, dry, TD 4,262 ft., elev. 1,050 ft.

San Mateo County, Pescadero area: The Texas Co. 1 Steele, 36-7s-5w, dry, TD 8,025 ft., elev. 509 ft.

Santa Cruz County, Bean Hill area: Union Oil Co. 2 Teresa Hihn, 34-10s-1e, dry, TD 3,569 ft., elev. 1,085 ft.

CALIFORNIA WILDCAT SUCCESSES

Kern County, Stevens zone discovery in Goosloo field: The Texas Co. 1 KCL-

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Goosloo, SW NW 20-29s-25e, flowed 45 bbl. per day oil and 113 bbl. water through perforations at 10,027-63 ft., 36.6°-gravity crude, 12/64-in. bean, TD 10,073 ft., elev. 311 ft.

Orange County, new fault block discovery in West Newport field: Pacific Supply Cooperative 1 Surf, 13-6s-11w, flowed 197 bbl. per day through perforations at 4,270-4,330 ft., 24.8°-gravity crude, 0.2 per cent cut, 18/64-in. bean, TD 4,672 ft., elev. 10 ft.

Texas Gulf Coast

Bee County Discovery Completed for Oil

HOUSTON. — Three miles northwest of Mineral in Bee County, Morris Cannan has completed 1 Willis Robertson for 135 bbl. of 39°-gravity oil daily through 1/8-in. choke. The well is producing from the Slick-Wilcox sand at 6,810-14 ft. Tubing pressure was 600 psi. and casing pressure 1,300 psi. The new discovery is located in C. B. Shain Survey.

Jordan Drilling Co. 1 Mrs. Pearl Wiggins, new Wilcox strike in Polk County, flowed an estimated 40 bbl. of 39.5°-gravity oil daily through 1/8-in. choke from perforations at 7,855-57 ft. This new field opener is located in G. S. Thomas Survey, Abstract 72, 12 miles south of Livingston. It is also 3 miles north of Livingston field.

In the same county, Shell Oil Co. 1 Kirby Lumber Co., James Stephenson Survey, Abstract 523, is drilling ahead in shale at 5,214 ft. Proposed depth of the venture is 9,000 ft.

Four miles south of Nome field in Jefferson County, Hunt Oil Co. has a prospective producer at 4 Dishman-Lucas, William McFarland Survey, Abstract 39. A drillstem test around 8,674 ft. recovered 651 ft. of pipe line oil and 180 ft. of oil cut mud. Bottom-hole flowing pressure was 3,650 psi. Preparations are under way to complete the well.

Final completion has been made at Tex-Harvey 1 Fred W. Dallas, Wilcox oil discovery in Washington County. From perforations at 7,611-13 ft., the well has been potentialed for 216 bbl. of 40.8°-gravity oil daily through 18/64-in. choke. Tubing pressure registered 1,125 psi. This discovery is located in Stephen F. Austin Survey, Abstract 8, 6 miles north of Brenham. It is also 6,375 ft. north-northeast of the firm's 1 Robert Winkelmann, which is being reworked.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT SUCCESSES

Bee County: Gas discovery—J. M. Hancock and Marion M. Young 1 May R. Klipstein, Bee County School Land Sur., A-87, TD 4,525 ft., perf. 3,014-26½ ft., IP 23,000,000 cu. ft. of gas per day, SIP 300 psi.

Calhoun County: Gas discovery—Humble Oil & Refining Co. 1 Espiritu Santo Bay State Tract 227, in Espiritu Santo Bay Sur., TD 6,494 ft., perf. 4,240-50 ft., IP 16,500,000 cu. ft. of gas per day, 5/32-in. choke, TP 1,310 psi.

Fort Bend County: New pay at Fulshear—Union Producing Co. 2 Watson, S. Habermaker Sur., A-189, TD 7,851 ft., perf. 6,833-44 ft., IP 79 bbl. oil per day, 8/64-in. choke, 41.7° gravity, SP 1,950 psi., TP 1,110 psi.

Goliad County: Gas-condensate discovery—G. O. Neathery, Jr., 1 O. G. Drier, SS&FA Sur., A-306, TD 5,565 ft., perf. 5,537-42 ft., IP 41,000,000 cu. ft. of gas per day plus 45 bbl. of distillate per million cubic feet of gas, 14/64-in. choke, TP 3,129 psi.

Lavaca County: Oil discovery—James G. McCarrick Trust 1 Lula Allen Est., R. P. Allen Sur. 18, A-707, TD 9,310 ft., perf. 9,149-54 ft., IP 11 bbl. oil per day, 1/8-in. choke, 27.5° gravity.

Washington County: Oil discovery—Tex-Harvey Oil Co. 1 Fred W. Dallas, Stephen F. Austin Sur., A-8, TD 9,423 ft., Wilcox 7,611-13 ft., IP 216 bbl. oil per day, 18/64-in. choke, 40.8° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Bridwell Oil Co. 1 Beeville Unit 1, James Hefferman Sur., A-31, dry, TD 4,208 ft.

Producers Corp. of Nevada 1 Brown F. Beasley, William Allen Sur., A-336, dry, TD 4,890 ft.

Harris S. Stahl 1 Delia Cowie Kennedy, Peter Allen Sur., A-73, dry, TD 3,150 ft.

Brazoria County: J. S. Abercrombie Co. 1 Walker, Imia Keep Sur. 42, A-79, dry, TD 12,036 ft.

Calhoun County: Quintana Petroleum Corp. 1 Oscar F. Hahn, James Lee Sur., dry, TD 9,139 ft.

De Witt County: F. Williams Carr 1 J. W. Boothe, Jesse E. Nash Sur., A-368, dry, TD 8,514 ft.

Hunt Oil Co. 1 Mrs. M. Friar, J. H. Parker Abstract 393, dry, TD 9,015 ft.

Rowan & Hope 1 Ernest Lemke et ux, John McDermott Sur., A-343, dry, TD 7,716 ft.

Fort Bend County: H. C. Cockburn 1 Clayton Foundation for Research, M. M. Battle Sur., dry, TD 8,825 ft.

Galveston County: The Texas Co. 1 Mrs. Edna Hughes et al, Martin Dunman Sur., A-53, dry, TD 7,774 ft.

Goliad County: Hassie Hunt Trust 3 Mrs. Ollie Webb, Maria de Jesus Barvo Sur., A-51, dry, TD 7,500 ft.

Hardin County: Ray M. Wouthworth 1 Hooks Est., L. J. Brun Sur., A-78, dry, TD 7,745 ft.

Harris County: Carl Casey 1 Autrey, Joseph Bays Sur., A-12, dry, TD 7,962 ft.

Jackson County: R. A. Josey, Inc., 1 T. N. Mauritz & Bros., James Cummings Sur., A-236, dry, TD 7,815 ft.

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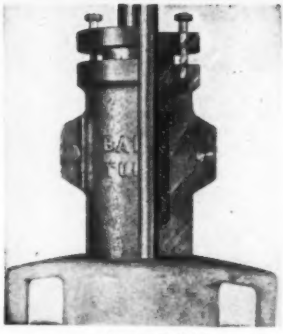

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Paisano Trading Co. 1 Otto Janssen, Victor Blanco Sur., dry, TD 7,387 ft.

Live Oak County: Crescent Oil Co. 1 Tom McNeil, Bridget Haughery Sur., dry, TD 1,018 ft.

Matagorda County: J. S. Abercrombie 1 J. C. Carlson et al, Sec. 17, Blk. 9., I&GN Sur., A-325, dry, TD 9,156 ft.

Orange County: Finkle Drilling Co. 1 B. E. Quinn, Pinkney Lout Sur., A-17, dry, TD 8,000 ft.

Refugio County: Spartan Drilling Co. et al 1 R. H. Welder, Juan Pobedano Sur., A-49, dry, TD 8,702 ft.

Victoria County: Henshaw Bros. et al 1 Annie Vaughn, Simon Cockrell Sur., A-151, dry, TD 8,519 ft.

Oklahoma

Production Indicated for Springer at West Cement

INDICATIONS that West Cement, in Caddo County, soon may be added to the growing list of southern Oklahoma fields in which the prolific Springer sand is proving productive have been given by high gas pressures encountered in that formation by a deep test which Magnolia Petroleum Co. is drilling in that field. This follows the recent discovery of prolific gas production in Springer sand at the neighboring Cement and Chickasha fields, the former in Caddo County, and the latter across the line in Grady County.

Magnolia's prospective new Springer discovery well, 13 Niles, SW NW NW 36-6n-10w, logged the top of this sand at 8,790 ft. It encountered a definite softening while drilling at 8,900 ft., and at 8,905 ft., with considerable gas showing, it tried to blow out. The blowout preventer was closed successfully, and as this is written, operators were pumping heavy mud to kill the pressures. Hole is open below 1,027 ft., where 13$^{3}/_{8}$-in. surface casing is cemented. A near-by shallower producer, 7 Niles, was showing signs of cratering around the pipe.

Further west, in the southwest corner of adjoining Washita County, the old West Sentinel field is taking on additional importance with another substantial extension of production in the new active development on the field's east flank. The latest extension well is Gulf Oil Corp. 1 Miller, C S$^{1}/_{2}$ NW SW 10-8n-20w, $^{3}/_{4}$ mile east of the nearest producer. It flowed 78$^{3}/_{4}$ bbl. of clean oil in the first hour, and 72.45 bbl. in the next 50 minutes, testing through 22/64-in. choke. Gas flow was estimated at more than 900,000 cu. ft. per day. Production in this new development is from granite wash. Total depth in the Miller extension is 6,275 ft. with hole open below 6,198 ft. This well is third and best well yet completed in the series of step-out locations being drilled by Gulf. Currently drilling, are a deep step-out test north of production and one south of production.

Down in southern Oklahoma, operators are continuing to watch two deep wildcat tests on the Cumberland field trend, in which oil staining is reported to have been encountered in Bromide sand. These wildcats are Stanolind Oil & Gas Co. 1 Barakat, SE SE NE 7-6s-8e, 5 miles southeast of the Cumberland field, near Silo, in northwestern Bryan County, and R. J. Caraway 1-B Rutherford, C S$^{1}/_{2}$ NW SE 32-4s-6e, about 6 miles northwest of the field, in northern Marshall County, just south of the Johnston County line. The former had good staining in the second Bromide sand at 7,458-63 ft. Top of the Bromide zone was given as 7,180 ft., the first Bromide sand at 7,412 ft., and the second Bromide sand at 7,543 ft. Hole at latest report was being cored ahead below 7,630 ft. with no additional shows or staining being recorded. The Caraway well is reported to have had 31 ft. of good oil-stained sand in cores at 8,272-8,303 ft. with

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hole still being cored ahead. No drill-stem tests have been made in either well.

OKLAHOMA WILDCAT FAILURES

Comanche County: D. H. Bolin 1 Devine, SE NE NE 14-1s-11w, dry, TD 3,058 ft.

Cotton County: Harper-Turner Drilling Co. 1 Taptto, SE NE SW 14-3s-12w, dry, TD 1,705 ft.

C. W. & W. L. Snoddy 1 Mary Anna Hall et al, NW NE NE NW 25-4s-13w, dry, TD 1,803 ft.

Jefferson County: W. H. Bryant 1 Georgia Doss, NE NE SE 33-5s-8w, dry, TD 4,065 ft.

Lincoln County: H. J. Mosser 1 Westfall, NE NE SW 18-16n-3e, dry, TD 5,012 ft.

E. J. Athens and Sunray Oil Corp. 1 J. H. Smith, NW NW SE 29-17n-2e, dry, TD 5,065 ft.

Logan County: A. O. Olson 1 Filtz, SE SE SE 34-20n-3w, dry, TD 6,105 ft.

Murray County: Anderson-Prichard Oil Corp. 1 Gannon, NW SE SW NE 34-1s-2e, dry, TD 3,161 ft.

Rocky Mountain

South Dakota Wildcat Has Show in Madison

DENVER.—Due to intense interest of oil operators throughout the nation in the Williston basin, shows of oil encountered by Shell Oil Co. at a deep wildcat in Corson County, South Dakota, are of concern. The well logged the Charles at 5,270 ft. and Madison at 5,583 ft. and cores in the Madison showed some staining. This well is 1 Winter, C NW SW 11-22n-19e, some 40 miles east of a recent failure by the company. On test 5,578-5,610 ft. the well made a small amount of mud with pinpoints of oil. However, tests below this interval showed sulfur water. On test 5,758-5,820 ft., tool open 1 hour, the well flowed mud and sulfur water in 51 minutes. Additional oil stainings were logged in a core 5,874-75 ft. and the operator is now drilling below 5,894 ft. on the well. Production established in the Madison and Devonian during the past year in northwestern North Dakota has led to such excitement that a discovery on the east side, or southeastern side of this basin would increase activity considerably. Shell has planned a three-well program on the South Dakota side of the basin, with the present well the second of the series.

In North Dakota Amerada Petroleum Corp. is presently completing the second Madison well in the Beaver Lodge area. Well 1 North Dakota "A," C NE SE 16-156n-95w, is being completed with casing cemented on bottom at 8,594 ft. This well flowed at the rate of 11 bbl. of oil per hour on 4-hour test of a part of the Madison. The well is 5 miles northeast of Amerada's first Madison completion at 1 Iverson, the first producing well in North Dakota. Other Amerada completions are near at 1 Bakken, C SW NW 12-157n-95w, in the Tioga area, northwest of Beaver Lodge, and 1 Dilland, C SW NE 31-156n-95w, in the Beaver Lodge field. Amerada 1 Risser, C SW SE 12-149n-96w, in the Croft area, topped Devonian at 10,998 ft. and Jefferson at 11,203 ft. and is drilling below 12,148 ft.

On the Montana side of the basin Shell Oil has completed the Pine Unit well, SW SW NE 30-12n-57e, Wibaux County, pumping 615 bbl. of fluid with 467 of this 33°-gravity oil. Production is from Devonian after the well was tes'ed thoroughly in Ordovician, which also showed oil on tests. The well is southeast of previous completions at Richey and Glendive by Shell and The Texas Co.. Devonian was acidized and thorough perforating and testing was conducted prior to the completion.

Pure Oil Co. is now swabbing at 3 Unit, SW NW SE 10-33n-84w, the deep test at West Poison Spider, Natrona County, Wyoming, and if the well is productive, it will be the deepest producer in the world. The well is at 16,607 ft., total depth, with tubing run to 16,039 ft. Pure displaced mud with oil and is now swabbing for a test of the lower zone. At total depth the well is believed to be in Nugget sand, and casing is cemented at 16,071 ft. Saturation was logged in the Lakota below 16,000 ft. Pure's discovery in this field established a production depth record when it was completed in 1949, with production in the Frontier formation at around 14,200 ft. The second well in the field was completed as a Mesaverde producer, for the first completion in that formation in central Wyoming.

Carter Oil Co. recovered 19°-gravity, high pour point oil on drill-stem test in the upper Green River at the second Duchesne, Utah, wildcat. The well is 1 Moon, C SE SE 13-4s-4w, 3 miles east of the Duchesne discovery. On test 2,668-2,706 ft., tool open 3 hours, there was gas at the surface in 17 minutes with a recovery of 840 ft. of heavy, tarry oil and 90 ft. of heavily oil-cut mud. Pour point of the oil is 94°. Carter is coring ahead below 2,747 ft. This oil is from a similar zone in the Duchesne discovery, and the well was completed as a producer from basal Green River formation at around 7,000 ft. The well is another of the series of basal Green River wildcats by Carter through the Uintah basin.

COLORADO WILDCAT SUCCESS

Mesa County, Highline Canal Unit: Amerada Petroleum Corp. 1 Unit, NW SE NE 2-9s-103w, 1,630 ft. S NL and 990 ft. W EL, 1,329 M.c.f. gas from Dakota, TD 2,783 ft. Dakota 2,008 ft., Morrison 2,163 ft., Entrada 2,768 ft. (Dakota gas discovery, new field).

COLORADO WILDCAT FAILURES

Logan County: Sinclair Oil & Gas Co. 1 Ziegler-Geer, NE SE SW 32-10n-53w, 330 ft. N SL and 330 ft. W EL SE SW, dry, TD 5,500 ft. 1st sand 4,882 ft., Muddy 4,988 ft., Skull Creek 5,056 ft., Dakota 5,224 ft., Morrison 5,455 ft.

Washington County: Amerada Petroleum Corp. 1 Heyen, NE NW SE 7-2s-52w, 2,300 ft. N SL and 1,590 ft. W EL, dry, TD 7,998 ft. Permian red beds 5,332 ft., Permian carbonate section 6,025 ft., Pennsylvanian 6,583 ft., granite wash 7,970 ft., granite 7,990 ft.

Weld County: Amerada Petroleum Corp. 1 Kellner, SE SE SE 29-8n-58w, dry, TD 6,737 ft. Greasewood 6,276 ft., Mowry 6,358 ft., Cloverly 6,624 ft., Morrison 6,722 ft.

WYOMING WILDCAT SUCCESSES

Big Horn County, South Byron: Lowell & Gish 2 Keele, Lot 96G 32-56n-96w, 650 ft. S NL and 200 ft. E WL, est. 3,000 M.c.f. gas from Peay sand, TD 3,079 ft. Torchlight 2,708 ft., Peay 3,055 ft., Peay Pay 3,059 ft. (new pay discovery).

Johnson County, North Fork: Stanolind Oil & Gas Co. and Continental Oil Co. 1 Government-Mains, C SW SW 19-44n-81w, flowed 173 bbl. oil from Tensleep, TD 7,373 ft., PBTD 6,680 ft. Chugwater 5,460 ft., Alcova 5,562 ft., Embar 6,228 ft., Tensleep 6,486 ft., Amsden 6,805 ft., Madison 7,276 ft. (Tensleep discovery—new field).

WYOMING WILDCAT FAILURES

Fremont County, Crooks Gap: Sinclair Oil & Gas Co. 10 Unit, SE NW NW 18-28n-92w, 990 ft. S NL and 990 ft. E WL, dry, TD 8,380 ft. Chugwater 6,605 ft., Alcova 7,065 ft., Dinwoody 7,900 ft., Phosphoria 7,950 ft., Tensleep 8,319 ft.

South Derby: Seaboard Oil & Superior Oil Co. 1 Unit, SW SW NW 10-31n-98w, 200 ft. N and 200 ft. E W¼c, dry, TD 2,238 ft. Alcova 607 ft., Dinwoody 1,824 ft., Phosphoria 1,873 ft., Tensleep 2,184 ft.

Niobrara County, South East Lance Creek: Continental Oil Co. 1 Martin & Lavin, NW NE NE 26-35n-64w, 330 ft. S NL and 990 ft. W EL, dry, TD 6,300 ft. Converse 4,965 ft., 1st Leo 5,510 ft., 2nd Leo 5,710 ft., Bell 5,980 ft., Guernsey 6,080 ft.

Washakie County, Sherard Dome: Ohio Oil Co. 1 Government, SE SW NE 24-47n-90w, 2,166 ft. S NL and 1,591 ft. W EL,

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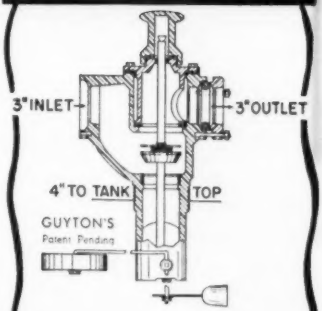

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dry, TD 3,681 ft. Embar 2,925 ft., Tensleep 3,206 ft., Amsden 3,435 ft., Amsden sand 3,561 ft., Madison 3,603 ft.

WESTERN NEBRASKA WILDCAT FAILURE

Dundy County: Muddy area: Deep Rock Oil Co. 1 Baney, SE SE SW 6-3n-37w, dry, TD 5,235 ft., Gilmore City 5,020 ft., Basal Paleozoic 5,160 ft., Weathered granite 5,220 ft.

Permian Basin

New Sterling Spraberry Field Has Second Oiler

MIDLAND.—The new Spraberry field of southwest Sterling County gained its second producer, a west offset to the discovery, at Honolulu Oil Corp. 1 Cope. Completion potential was 381 bbl. of 38°-gravity oil a day through $\frac{7}{16}$-in. choke from sand pay between 5,074-5,120 ft. Flowing tubing pressure was 350 psi. High initial production and the relatively shallow depth mark the area as one of the important sectors in the Spraberry. Both wells were completed without fracturing the sand section.

On the east side of the Flat Rock field of Upton County, Cities Service Oil Co. 2-AH University made a heavy flow of high-gravity oil on a drill-stem test in the Ellenburger. Top on the formation had not been picked but it apparently was running high to the 1-AH University, one location west, which recently was recompleted as a small Spraberry well after depleting the Ellenburger.

Drill-stem test at the 2-AH University was from 10,697-10,743 ft., using 1,000 ft. of water blanket. Gas surfaced in 15 minutes, water blanket in 21 and oil in 37 minutes. At the end of 49 minutes it was turned into tanks to gage 74.4 bbl. of oil in 1 hour. Bottom-hole flowing pressure ranged from 1,523-3,225 psi. The well unloaded 34 bbl. of oil while pipe was being pulled.

Southeast of the Wilshire field, Pure Oil Co. 1 R. S. Windham, 107-D-CCSD&-RGNG, kicked off and flowed mud, oil, and acid residue after treating the Wolfcamp section through perforations at 9,060-9,125 ft. Location is a south offset to Greenbrier Oil Co. and Anderson-Prichard 1 Windham.

Southern Upton County gained a deep wildcat, to be drilled by L. M. Glasco and George Greer, Dallas. Location had been staked for the 1 Tow Owens, in 19-B-GC&SF, 2 miles northwest of Rankin. Contract depth of 12,000 ft. is expected to explore the Ellenburger.

Another lower Spraberry well was in the making at General American Oil Co. 1-40 Proctor, depleted upper Spraberry producer, in northwest Reagan County. Operators had plugged back to test the Clear Fork from 6,422-6,526 ft., which developed 6 bbl. of oil a day on the pump. Hole was then drilled out to 7,839 ft., new total depth, and at last report the well was flowing oil after acidizing open hole between 7,801-39 ft. Location is 40-37-T5S-T&P Survey.

In southern Glasscock County, Nelson Bunker Hunt Trust 1 J. T. Daniels, 10-35-T5S-T&P, prepared to fracture the Spraberry through perforations at 7,216-7,358 ft. Previous perforations at 7,054-7,112 ft. filled the hole with heavy oil at the rate of 3 bbl. an hour.

In Andrews County, Gulf Oil Corp. 1-NNN University, 21-9-University Survey, had top of the Ellenburger at 12,519 ft., minus 9,322 ft. Drill-stem test from 12,515-51 ft. recovered 2,960 ft. of 45°-gravity oil, plus some drilling mud cut with oil.

At 12,545-96 ft., 2-hour recovery was 5,554 ft. of oil and 180 ft. of oil and mud. Operators were coring ahead. Nearest Ellenburger production is in the Embar field, 7 miles west.

Seven miles west of San Angelo, The Texas Co. 1 Sam Kelly was running a second test of the Strawn from 5,932-73 ft. First test from top of the Strawn at 5,920 ft. to 5,932 ft. developed 40 ft. of mud with no shows.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT SUCCESSES

Gaines County: W. M. & A. F. Fuller 1 A. B. Wharton, 23-A21-PSL, TD 5,970 ft., elev. 3,289 ft., San Andres pay 4,720 ft., IP pumped 124 bbl. 32°-gravivty oil, GOR 200 cu. ft.

Irion County: Humble Oil & Refining Co. 1 Pearl Williams, Sec. 1,197, TPRR Sur., TD 7,264 ft., elev. 2,478 ft., Strawn 7,230 ft., pay 7,236 ft., IP 311 bbl. 46°-gravity oil, 9/64-in. choke, TP 480 psi., GOR 171 cu. ft.

Reagan County: Sohio Petroleum Co. 1-A E. G. Cauble, 34-38-T5S-T&P, TD 7,490 ft., elev. 2,697 ft., lower Spraberry 7,489 ft., pay 7,480 ft., IP 233 bbl. 40°-gravity oil, 1½-in. choke, TP 100 psi., GOR 850 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: R. L. Wood 1 W. E. Murphy, 82-25-H&TC, dry, TD 7,010 ft., elev. 2,296 ft., San Andres 2,320 ft., reef 6,984 ft.

Crockett County: Standard Oil Co. of Texas 1-4 J. M. Shannon, 37-BB-TCRR, dry, TD 8,962 ft., elev. 2,687 ft., Spraberry 4,927 ft., Ellenburger 8,882 ft.

Crosby County: Deep Rock Oil Corp. 2 Morgan Jones, 11-1-WCRR, dry, TD 8,771 ft., elev. 2,659 ft., Pennsylvanian 7,780 ft., Mississippian 8,240 ft., Ellenburger 8,697 ft.

Kent County: The Texas Co. 1 Emery, 24-2-H&GN, dry, TD 7,294 ft., elev. 2,219 ft., reef 6,114 ft.

Pecos County: H. S. Moss 1 Howard Derrick, 13-119-T&STL, dry, TD 3,066 ft., Yates 2,928 ft.

Spencer and Griffin 1 Arnold, 18-1-H&TC, dry, TD 1,755 ft.

E. C. Ward 1 Allison Ranch, 6-2-TCRR, dry, TD 715 ft.

Reeves County: S. A. Winfrey 1 Green, 235-13-H&GN, dry, TD 5,344 ft., elev. 2,946 ft., Delaware lime 4,770 ft.

Runnels County: Callahan Rotary Co. 1 Mrs. J. Stubblefield, J. F. Wrenn Sur., Sec. 275, dry, TD 5,284 ft., Palo Pinto 4,140 ft., Ellenburger 5,208 ft.

G. B. Cree 1 W. W. Deitz, J. E. Hooten Sur., dry, TD 3,972 ft.

Schleicher County: Taylor Refining Co. 1-G Grosby, 14-K-GH&SA, dry, TD 461 ft.

Taylor Refining 1 Tissie Wardlaw, 18-K-GH&SA, dry, TD 5,410 ft., elev. 2,291 ft., Strawn 4,730 ft., Ellenburger 5,205 ft.

Scurry County: Boyce-Smiser-Runion Oil Co. 1 A. Koonsman, 225-2-H&TC, dry, TD 7,681 ft., elev. 2,282 ft., Ellenburger 7,575 ft.

Tom Green County: J. D. Deane, Jr., 1 Homer Byrd-Texas Co., Sec. 64, Decker Sur. 875, dry, TD 465 ft.

G. W. Strake 2 W. C. Weddell, 73-5-H&TC, dry, TD 1,325 ft.

Upton County: Shore Exploration Co. 1 T. C. Linthicum, 7-B-GC&SF, dry, TD 2,258 ft.

TEXAS PANHANDLE

AMARILLO.—Small gas shows have been recorded on a Potter County wildcat, the Standard of Texas 1 Bush, 20 miles northwest of Amarillo. In two tests taken at 4,350-4,415 ft., small amounts of gas, along with drilling mud and salt water, were recovered from the drill-stem. Currently, drilling is going ahead toward the projected total depth of 6,500 ft. or granite.

The test is located 7 miles west of the well-defined Bush dome in the same county, which produces a high helium content gas within its small areal extent. Other than in this one structure, no production has yet been obtained from the Palo Duro basin lying south of the buried Amarillo Mountains.

Lost circulation at 7,500 ft. in the Cleveland sandstone has prevented production tests from being taken on the Sinclair 1 Hoover, Ochiltree County wildcat. A good show of gas at 9,862 ft., and an increase at 9,900 ft., both in Morrow, were scheduled for drill-stem testing before circulation trouble was encountered. Present total depth is 9,928 ft., with returns still poor.

A final company test of 4,830,000 cu. ft. of gas has been taken on the Phillips 1 Giles "A," southeast extension to the Wheat area of Gray County, and the well has been shut in to await Railroad Commission test. Plug back total depth is 2,692 ft. in Wolfcamp of Permian age.

In north central Gray County the Phillips 1 Hobart Ranch is being acidized through perforations at 8,364-74 ft., where a flow of 3,105,000 cu. ft. of gas was gaged. The Hobart is a deep wildcat located on the southwestern edge of the Anadarko basin. Total depth of the apparently successful well is 10,001 ft.

Eight miles west of the Lips field in Roberts County the Sinclair 8 Lips has been abandoned at a total depth of 9,455 ft. in Mississippian. A small amount of gas-cut mud was recovered from a drill-stem test in Wolfcamp, and an estimated 200,000 cu. ft. of gas flowed from a Morrowan drill-stem test, but production was not commercial.

Standard of Texas has made location for a 7,000-ft. wildcat in southern Floyd County, 8 miles southeast of Floydada. The 1 Minnie Adams is to be drilled in Section 32, P. D. Adams Survey.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES

Armstrong County: H. L. Hunt 4 Ritchie, 122-G6-A&G, 17 mi. SW Goodnight, dry, TD 7,070 ft., elev. 2,691 ft.

H. L. Hunt 6 Ritchie, 111-G5-D&P, dry, TD 4,000 ft. in dolomite, elev. 2,648 ft.

Donley County: Hunt Oil Co. 5 Ritchie 108-G5-D&P, dry, TD 6,505 ft., elev. 2,560 ft., pre-Cambrian 6,440 ft.

SOUTHEASTERN NEW MEXICO

Flowing production from the Devonian was developed by Buffalo Oil Co. 12-B Baish, deep wildcat in the Maljamar area of Lea County. In 5 hours, the well flowed 104 bbl. of 47°-gravity oil through open 2-in. tubing, plus about 20 per cent drilling mud.

Top of the Devonian was called at 12,560 ft., on elevation of 4,022 ft. It was drilled to 13,568 ft. and set casing to 13,557 ft. When load water was swabbed out the well kicked off to make the above flow.

In addition to the Devonian oil, a 4-hour drill-stem test in the Pennsylvanian developed 4,070 ft. of 37°-gravity oil. Top on the Pennsylvanian was 10,050 ft.

Location is some 20 miles southwest of nearest Devonian production in the Saunders field.

NORTHEASTERN NEW MEXICO

In Union County the Nelson and Moore Fee, 33-30n-29e, has reached a total depth of 2,685 ft. in granite, and has been plugged back for test of a show of carbon dioxide estimated at 1,500,000 cu. ft. Perforations from 2,560-80 ft. were dry and have been squeezed. More testing is in progress.

Drilling operations have commenced at the Ryan and Sharp 1 Haynes, 23-5n-19e, Guadalupe County. Present total depth is 805 ft., where operators are cementing lost circulation.

Drilling is below 3,380 ft. at the Ray Oil Co. 1 Hoover, 23-5n-19e, Quay County cable tool test. Seven-inch casing has been set at 3,089 ft. to shut off water entering the well bore.

LEGAL

SEALED bids for oil and gas mining leases on certain trust lands on the Crow Indian Reservation, Big Horn County, State of Montana, will be received at the Office of the Superintendent, Crow Indian Agency, Crow Agency, Montana, up to 2:00 o'clock P.M., Mountain Standard Time, March 7, 1932. For further information, call or write L. C. Lippert, Superintendent, Crow Indian Agency, Crow Agency, Montana.

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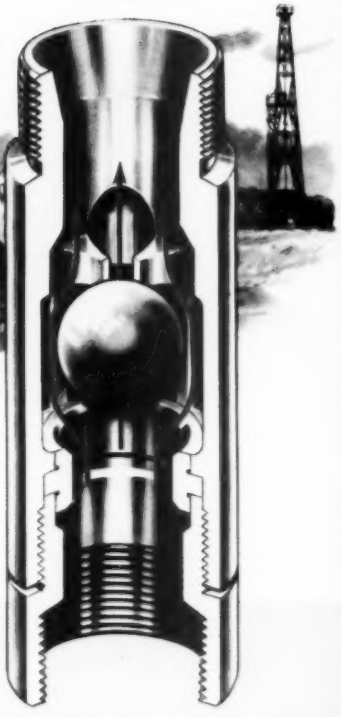

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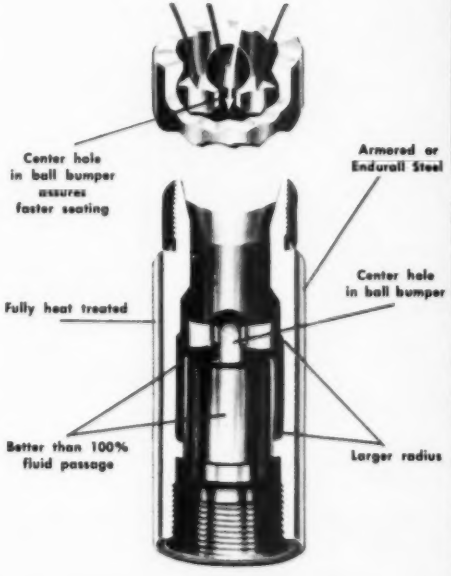
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Central Area

ILLINOIS

Tom S. Doran and Ted Glass are opening a new shallow Cypress sand pool in the northeast corner of Perry County, on the southwest side of the Illinois basin, at their 1 Zmudinski, NW SW SE 14-4s-1w. Oil rose in the hole at the rate of 80 ft. per hour after plug was drilled. The well now is being put on the pump for completion, and operators estimate it good for 50 bbl. of oil per day. Bottom of the hole at 1,136 ft. still is in saturated sand, topped at 1,130 ft. Five feet of the hole is open. Location is a little more than a mile northeast of the Tamaroa pool, also producing from the Cypress. It is more than 5 miles from nearest other production.

INDIANA

H. Sterling has completed a small discovery well in northeastern Daviess County at his 1 Daugherty, in the C N½ SW 27-5n-5w, 2 miles east of Odon. The well pumped 16 bbl. of fluid, 50 per cent oil, from Salem lime at 875-76 ft. in open hole at 871-78 ft. The discovery, more than 5 miles from other production, has been designated as the Odon East pool.

Indiana Farm Bureau 1 Schwitz, SW SW NW 16-6s-11w, which opens the second pay zone (Aux Vases) for the new Belknap East pool, 2 miles west of Evansville, in Vanderburgh County, produced at the rate of 13 bbl. of oil an hour natural during swabbing tests and now is being put on the pump for completion. Pay is at 2,546-53 ft. with bottom still in saturation. Other production (three wells) in the pool, opened last October, is from Biehl sand around 1,525 ft. The new well extends production a location north.

WESTERN KENTUCKY

George & Wrather and associates are completing their second Rosiclare-McClosky producer in the new Onton North pool, in the eastern tip of Webster County. It is their 2 Mahurin-Luck, located 915 ft. southwest of their initial well, 1 Mahurin-Luck, NW SE SE 2-M-25, completed early in January. The new well produced at the rate of 8 bbl. of oil per hour during swabbing tests, and is being put on the pump. Casing is perforated at 2,699-2,709 ft., opposite Rosiclare saturation, and 2,716-22 ft., opposite the McClosky pay. Hole is plugged back to 2,725 ft. from its original total depth of 2,796 ft.

EASTERN KENTUCKY

In the Pilot Pool in Estill County, Lucsom Corp. has completed 11 H. T. Williams located on Billie's Fork for 25 bbl. of oil daily. Producing formation is the Corniferous lime topped at 949 ft. and bottomed at 987 ft.

In the Pike County sector of the Big Sandy Gas Field, Kentucky West Virginia Gas Co. has completed 6035 John H. Adkins for 440,000 cu. ft. of gas daily from the Maxon (Mississippian) sand at a total depth of 2,012 ft.

MICHIGAN

The Detroit River sour zone oil pay in the Headquarters oil pool, Roscommon County, started to take on new significance this week, and this shallower pay zone was overshadowing the deeper Richfield oil pay which has been under test in the pool at two wells for several weeks.

The Richfield discovery well for the Headquarters field, E. V. Hilliard RL-1 State-Roscommon, N½ SE SW 29-21n-3w, Roscommon Township, Roscommon County, was plugged back from its Richfield total depth, 5,346 ft., to 5,000 ft. and was perforated in the sour zone with 29 shots from 4,944 to 4,951 ft., and with 33 shots from 4,878-86 ft. After this perforated pay zone was acidized with 3,000 gal. well flowed 250 bbl. of net oil first 48 hours, was flowing at the rate of 75 bbl. of oil a day at this writing and had not averaged less than 50 bbl. a day flowing since acid load had been swabbed from the hole.

ILLINOIS WILDCAT FAILURES

Clinton County: H. Eiteljorg 1 Lutheran, SW SW SE 27-3n-4w, dry, TD 2,309 ft.
Edgar County: M. L. Livengood 1 Wood, NW NE NW 23-13n-11e, dry, TD 1,086 ft.
Jasper County: Sun Oil Co. 1 Burke, NW SE SE 28-7n-8e, dry, TD 3,075 ft.
Turnipseed & Farmall 1 Hartrich, SW SW NW 30-6n-11e, dry, TD 4,500 ft.
Jefferson County: Don Slape 1 Copple-Gray, SW NW NW 6-1s-2e, dry, TD 2,450 ft.
Lawrence County: Ervin Bassett 1 Salesman, NW NW NE 28-5n-12w, dry, TD 1,795 ft.
White County Mark Twain 1 Huebele, NE NE NW 16-5s-9e, dry, TD 3,234 ft.

INDIANA SUCCESSFUL WILDCATS

Daviess County: H. Sterling 1 Daugherty, C N½ SW 27-5n-5w, IP 8 bbl., Salem 875-76 ft., TD 878 ft. (discovery well Odon East pool).
Pike County: K. D. Holland 1 Radcliff, SE SW NW 16-1n-9w, IP 4,500,000 cu. ft. ags, Cypress 1,359-62 ft., TD 1,362 ft. (extends Union-Bowman pool).

INDIANA WILDCAT FAILURES

Daviess County: McMahan & Davis 1 Woodruff, S½ SE NW 34-5n-6w, dry, TD 1,107 ft.
Dubois County: Sunlight Coal Co. 1 Buchlein, SE SE NE 5-2s-4w, dry, TD 1,312 ft.
Knox County: Hayes Drilling Co. 2 Gartner, Lot 45, Survey C-2n-10w, dry, TD 1,939 ft.
Posey County: D. Gulde 1 Huber, SW SW SW 28-5s-12w, dry, TD 2,839 ft.
Slagter Producing Co. 1 Keck, NW NW SE 2-7s-13w, dry, TD 2,860 ft.
Sullivan County: F. B. Cline 1 Bragdon, NW NE SW 5-8n-10w, dry, TD 510 ft.
Vigo County: F. B. Cline 1 Hall, NE SW NE 22-10n-10w, dry, TD 2,353 ft.
Warrick County: Tecumseh Coal Co. 47 Northern, NW NW SE 5-4s-7w, dry, TD 535 ft.
Sunlight Coal Co. 1 Reyl, SE SE SW 16-5s-9w, dry, TD 2,176 ft.
Sunlight Coal Co. 1 Neyhouse, NE NE SW 28-5s-9w, dry, TD 2,102 ft.

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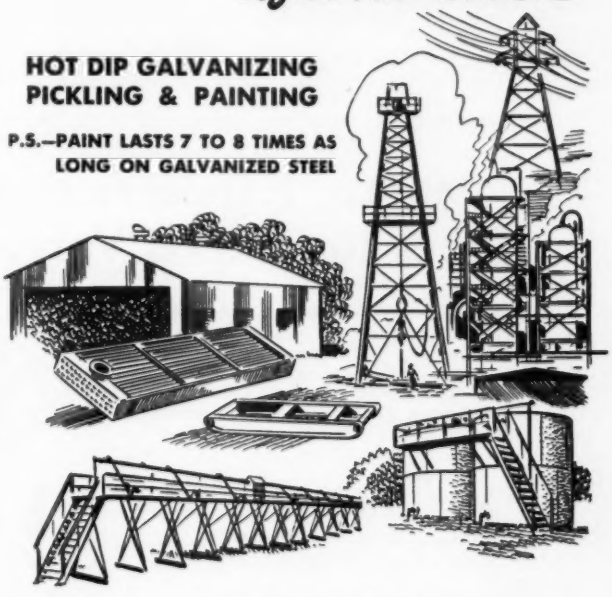
P.S.—PAINT LASTS 7 TO 8 TIMES AS LONG ON GALVANIZED STEEL



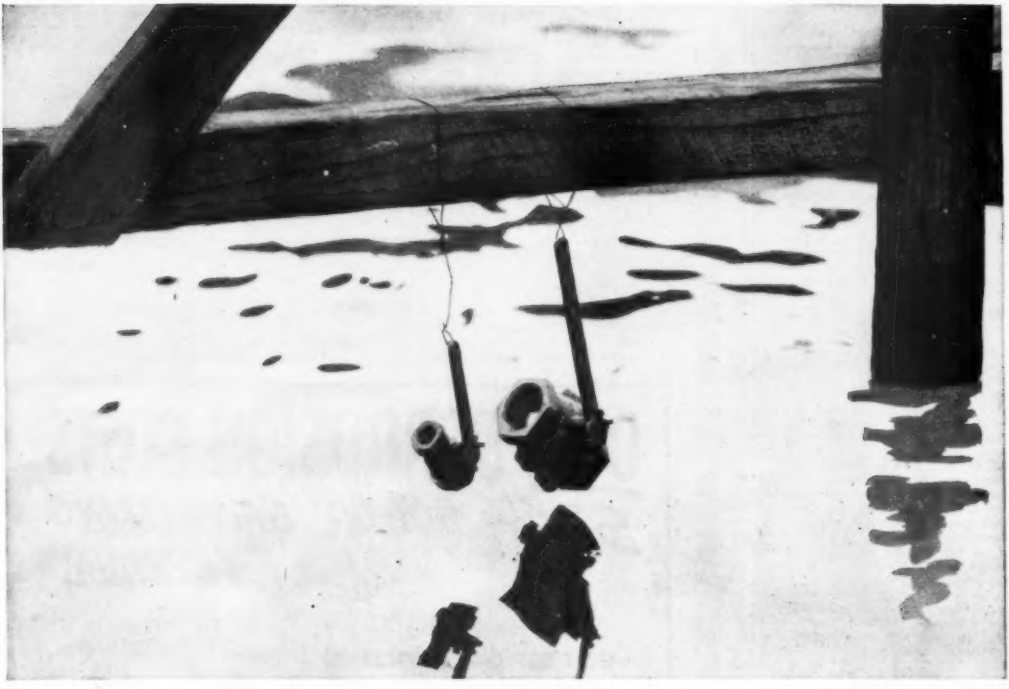
NO JOB TOO LARGE

BOYLES

IT CAN'T BE TOO SMALL

BOYLES GALVANIZING COMPANY

3349 W. 5th St. TULSA, OKLAHOMA Phone 3-9158



THESE ROCKWOOD BALL VALVES were undamaged after hanging from a Connecticut pier for 3 months.

90-Day Exposure to salt water leaves Rockwood Valves unharmed

The dramatic test for Rockwood Ball Valves, shown above, was conducted by a public official of New Haven, Connecticut.

He suspended a ¾" and a 2" bronze valve from his pier. He hung the valves at the mean tide level so that they were alternately immersed in salt water and exposed to salt air . . . then left them in a partially open position for 3 months.

Result?

After being taken apart, examined, reassembled and retested, both valves were found free from any sign of leakage! *From all appearances they were in no way affected by the severe exposure conditions to which they were subjected.*

WHAT THIS TEST MEANS TO YOU

You, too, can depend on Rockwood Ball Valves not only in lines handling salt water but also in lines handling all types of liquids and gases such as carbon dioxide, nitrogen, paraffin and asphalt base petroleums, alcohol and others. Rockwood Valves are built to stand the gaff.

Available in bronze in pipe sizes from ½" to 2" and in cast steel from 3" to 4". Recommended for 300 psi working pressure.

If you are not now using Rockwood Valves why not write for Bulletin V-4 today? Get complete data including prices and applications.

INDIVIDUAL PARTS of Rockwood Valves are here shown after 90-day water test. Note excellent appearance.

★ Leakproof service
★ Full round flow
★ Quick opening and closing
★ No maintenance

ROCKWOOD SPRINKLER COMPANY
104 HARLOW STREET, WORCESTER 5, MASS.
Distributors in all principal cities

Sunlight Coal Co. 1 Bayer, SE NE SW 14-6s-8w, dry, TD 1,761 ft.
Sunlight Coal Co. 2 Eble, NW SW NE 26-6s-8w, dry, TD 1,846 ft.
Sunlight Coal Co. 3 Eble, SW SE NW 26-6s-8w, dry, TD 1,849 ft.
Northern Illinois Coal Corp. 1 Edwards, SW NW NE 8-6s-8w, dry, TD 1,890 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Christian County: T. J. Pate et al 2 Stevenson, N½ SW SW SW 1-G-23, dry, TD 455 ft.
T. J. Pate et al 1 Stevenson, S½ NE SE SW 1-G-23, dry, TD 892 ft.
Henderson County: C. E. O'Neal et al 1 Whitledge, W½ SE SE NE 25-P-23, dry, TD 2,695 ft.
Skiles Oil Corp. 2 Jones, SW SW SW NE 3-O-25, dry, TD 745 ft.
Hopkins County: Pate & Morgan 1 Poe, NEc SE SE SE G-1-21, dry, TD 1,429 ft.
Logan County: Carter Oil Co. 1 White, NEc SE NW SW 22-F-34, dry, TD 1,629 ft.
Webster County: Iley Browning & Sons 1 Jewell, W½ SE NE SE 7-N-23, dry, TD 2,752 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Overisel Township: Ford Oil Co. 1 Boerman, SE SW SW 25-4n-14w, Traverse 1,612 ft., dry, TD 1,626 ft.
Watson Township: Bradley & Davidson 1 Cavanaugh, NW SW SE 8-2n-12w, Traverse 1,696 ft., dry, TD 1,703 ft.

Appalachian-Ohio

Deep West Virginia Test Completed for Gas

PITTSBURGH.—Portland district, Preston County, West Virginia, Hope Natural Gas Co. 9665 J. Paul Martin, deep test, elevation 2,308 ft., was completed with 1,018,000 cu. ft. gas, chert 5,223 ft., gas 5,258, 5,282-5,288 and 5,392 ft., Oriskany sand 5,587 ft., gas 5,658-5,660 ft., 5,668-5,670 ft., and 5,683-5,687 ft., TD 5,907 ft. Magnolia district, Mingo County, Columbian Carbon Co. 2-1174 Red Jacket Coal Corp., resulted in 4,287,000 cu. ft. gas, Big Lime, TD 4,508 ft. Summersville district, Nicholas County, Production Associates 5 Elk River Coal & Lumber Co., tested 1,046,000 cu. ft. gas, Maxon sand, TD 1,607 ft.

Garrett County, Maryland, Mid-Atlantic Oil & Gas Co. 1 B. & O. R. R. Co., elevation 2,400 ft., reached the Onondaga at 3,628 ft., and is shut down at 3,633 ft. to run casing. No. 1 Joe Collins is shut down at 3,970 ft., Onondaga 3,878 ft., chert 3,912 ft., with gas testing 450,000 cu. ft. Roy Fletcher 1 A. W. Killius, elevation 2,450 ft., Onondaga 3,819 ft., chert 3,856 ft., gas testing 330,000 cu. ft., blew down to 150,000 cu. ft., is drilling at 4,013 ft., in the Oriskany sand which was topped at 3,967 ft.

WEST VIRGINIA SUCCESSFUL WILDCAT

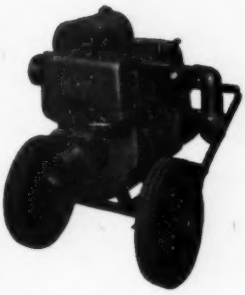
Preston County: Portland district, Preston County, Hope Natural Gas Co. 9665 J. Paul Martin, elev. 2,308 ft., 1,018,000 cu. ft. gas, chert 5,223 ft., gas 5,258 ft., 5,282-5,288 ft., and 5,392 ft., Oriskany sand 5,587 ft., gas 5,658-5,660 ft., 5,668-5,670 ft., and 5,683-5,687 ft., TD 5,907 ft.

OHIO

Palmer & Geisinger extended the Layland pool over into Killbuck Tdwnship, Holmes County, with a gasser on 1 C. W. Young in Section 24. Clinton sand at 3,270-91 ft. made 520,000 cu. ft. natural, and 1,130,000 cu. ft. when shut in 3 hours after shot.

Webster Myers 1 Jesse Wilson, Section 7, Windsor Township, Lawrence County, a ½ mile north extension, found a pay in the shale at 2,060-70 ft. that made 1,500,000 cu. ft. After blowing open for 3 days, the well gaged 200,000 cu. ft., and will be drilled through the shale and shot.

Today - See the new MARLOW PUMPS ...GREATEST EVER BUILT!



Think of everything you've ever wanted in a self-priming centrifugal pump — you'll find it in the new Marlows, the greatest advance in this kind of pump since Marlow invented it a generation ago. They prime faster than any others — and at higher suction lifts; pump more liquid — and at easier engine speeds; will last indefinitely — and without troubles.

They'll give you the best and most economical pumping service you've ever had. Made in many sizes, 1½" to 10" — 4,000 to 240,000 gallons per hour. Available engine driven, electric motor driven or adapted for belt drive.

MARLOWS LAST INDEFINITELY!

A Marlow is the only self-priming centrifugal pump made with a replaceable impeller and diffuser. After long hard use, these parts can be easily and inexpensively replaced with new ones to restore the pump to full original efficiency.

MARLOW — EVERYWHERE

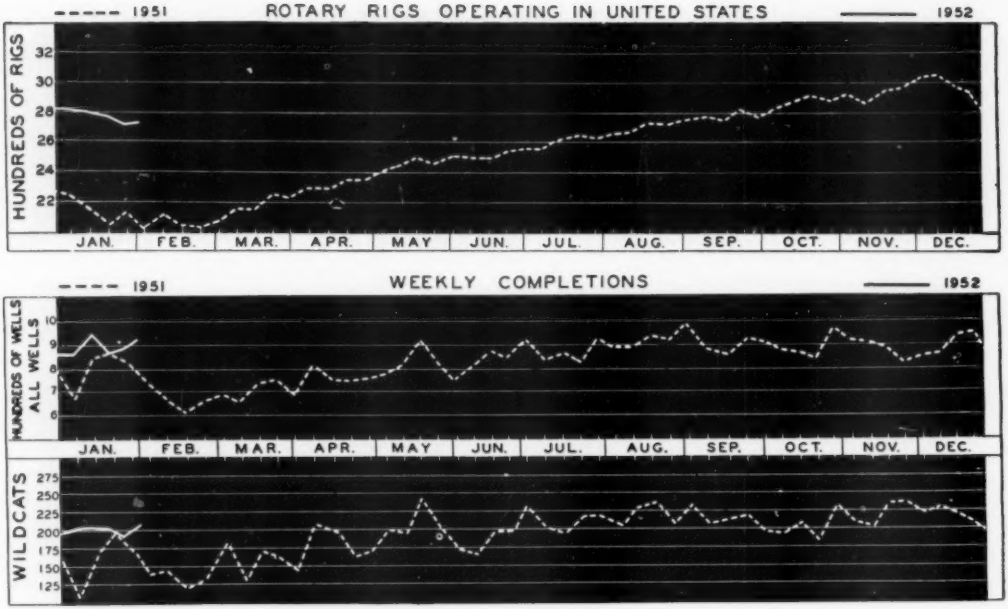
Marlow pumps are sold and serviced by leading equipment distributors in 48 states and 49 foreign countries. Backed by the Marlow organization — the largest of its kind.

— CATALOG SENT PROMPTLY —

MARLOW PUMPS

RIDGEWOOD NEW JERSEY

Manufacturers of the World's Finest General Utility Pump for the Oil Country — Including the Famous Marlow Mud Hogs



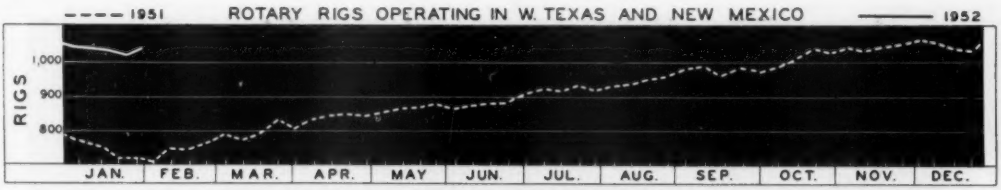
CURRENT STATISTICS

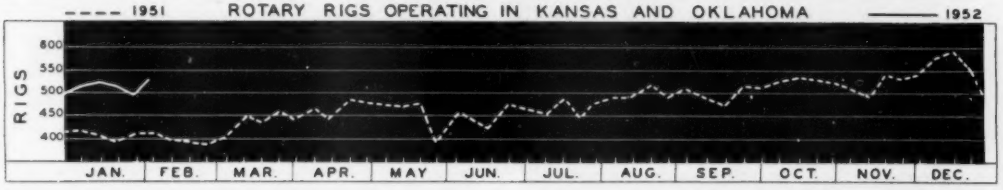
EXPLORATION

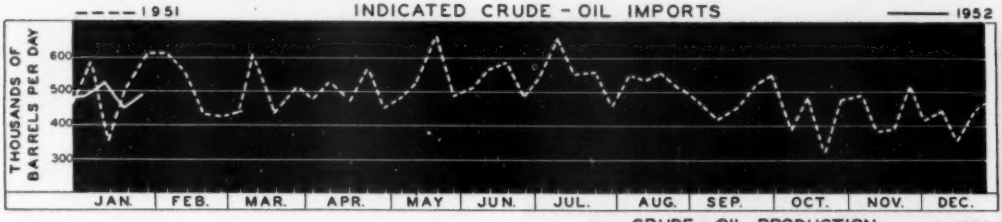
WEEKLY WELL COMPLETIONS . . . WEEK ENDED FEBRUARY 2, 1952

	Total of all wells					Feb. 2		Wildcat completions and discoveries					Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	5	3	0	*2	8,500	31	37	0	0	0	0	0	0	0	0	0	0
Pennsylvania	25	10	7	†8	41,000	137	75	0	0	0	0	0	0	0	0	0	0
West Virginia	14	3	10	1	40,212	71	62	0	0	1	0	1	0	0	1	0	1
Ohio	16	8	2	*6	34,700	75	88	0	0	0	0	0	0	0	1	0	1
Indiana	35	6	1	28	59,299	103	96	1	0	1	14	16	5	0	2	36	43
Kentucky	21	5	4	12	42,295	117	86	0	0	0	7	7	2	0	0	19	21
Illinois	26	11	0	15	72,348	134	209	0	0	0	7	7	0	0	0	34	34
Michigan	11	5	0	6	33,655	52	59	0	0	0	2	2	4	0	0	18	22
Kansas	122	62	8	52	425,800	518	377	3	0	0	15	18	11	0	1	98	110
Nebraska	1	0	0	1	5,235	27	29	0	0	0	1	1	1	0	0	18	19
Oklahoma	120	72	2	†46	403,627	621	553	0	0	0	8	8	7	1	3	62	73
Texas	359	196	15	148	1,839,594	1,590	1,520	14	1	3	94	112	62	7	10	384	463
North Central (Dist. 7-B & 9)	90	35	0	*55	296,013	476	439	5	0	0	34	39	36	0	1	173	210
West (Dist. 7-C & 8)	120	94	0	26	689,114	482	442	3	0	0	16	19	11	0	0	49	60
Panhandle (Dist. 10)	11	4	2	5	40,804	59	67	0	0	0	3	3	1	0	1	7	9
Eastern (Dist. 5 & 6)	14	7	1	6	91,626	76	117	0	0	0	5	5	2	1	0	19	22
Gulf Coast (Dist. 2 & 3)	75	34	7	34	496,268	279	230	3	1	2	20	26	4	4	4	70	82
Southwest (Dist. 1 & 4)	49	22	5	22	225,769	218	225	3	0	1	16	20	8	2	4	66	80
Louisiana	48	27	5	16	349,509	233	203	2	1	0	3	6	4	3	0	23	30
Northern	27	16	4	7	117,091	134	98	2	0	0	1	3	2	0	0	13	15
Southern	21	11	1	9	232,418	99	105	0	1	0	2	3	2	3	0	10	15
Arkansas	8	5	0	3	30,803	37	45	0	0	0	2	2	1	0	0	8	9
Mississippi	8	2	1	5	63,748	39	21	0	0	0	4	4	2	0	0	15	17
Southeastern States	2	1	0	1	6,854	4	8	1	0	0	1	2	1	0	0	2	3
Montana	2	1	0	1	5,444	20	14	0	0	0	0	0	1	0	0	6	7
Wyoming	16	8	1	7	76,237	69	59	1	0	1	4	6	5	0	1	10	16
Colorado-Utah	10	3	2	5	51,032	51	26	0	0	1	3	4	3	0	2	14	19
New Mexico	17	10	4	3	73,406	86	61	0	0	0	0	0	3	0	0	6	9
California	57	42	0	15	252,700	211	154	2	0	0	11	13	8	0	0	39	47
Miscellaneous	0	0	0	0	0	7	2	0	0	0	0	0	0	0	1	1	2
Total United States	923	480	62	381	3,915,998	4,233	3,784	24	2	7	176	209	120	11	22	793	946
Total previous week	884	465	57	332	3,874,793	....	....	21	5	3	160	189	96	9	15	617	737
Total February 3, 1951	753	420	55	278	2,871,291	....	....	26	1	1	110	138	126	8	23	621	778

Service wells included: *2, †7, ‡3.





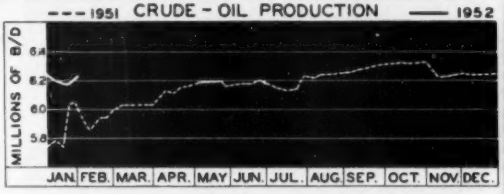


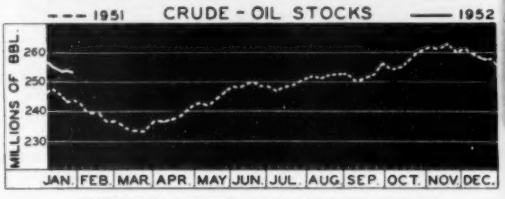
DAILY AVERAGE PRODUCTION FOR WEEK

	February 2, 1952			Jan. 26
	Crude oil	Lease condensate	Total	total
Alabama	2,700		2,700	2,700
Arkansas	75,595	4,605	80,200	85,525
California	980,700		980,700	981,400
Colorado	81,800		81,800	82,150
Eastern	56,500		56,500	57,000
Florida	1,575		1,575	1,775
Illinois	167,600		167,600	170,800
Indiana	30,400		30,400	29,200
Kansas	306,800		306,800	323,300
Kentucky	33,200		33,200	34,100
Louisiana	616,450	39,950	656,400	656,050
North Louisiana	112,900	14,950	127,850	127,650
South Louisiana	503,550	25,000	528,550	528,400
Michigan	39,700		39,700	37,800
Mississippi	99,835	3,965	103,800	100,750
Montana	24,900		24,900	23,850
Nebraska	6,300		6,300	6,250
New Mexico	154,775	300	155,075	153,875
Oklahoma	519,700		519,700	521,900
Texas	2,752,225	46,550	2,798,775	2,749,025
Dist. 1	32,350	225	32,575	32,375
Dist. 2	158,650	4,000	162,650	159,000
Dist. 3	456,200	24,625	480,825	473,450
Dist. 4	250,075	5,200	255,275	250,270
Dist. 5	54,625	375	55,000	51,725
Dist. 6	121,225	4,325	125,550	124,100
East Texas field	269,100		269,100	268,200
Dist. 7-B	85,150	125	85,275	83,900
Dist. 7-C	127,175	6,775	133,950	130,125
Dist. 8	955,600	550	956,150	934,900
Dist. 9	158,650	350	159,000	157,430
Dist. 10	83,425		83,425	83,550
Utah	4,500		4,500	4,400
Wyoming	185,000		185,000	183,000
Total U. S.	6,140,255	95,370	6,235,625	6,204,850
Change from previous week, up			30,775	
Canada	114,132		114,132	131,644

Total U. S. production January 1-February 2 — 204,761,470 bbl.

Same period last year (crude plus cond.) — 195,649,300 bbl.



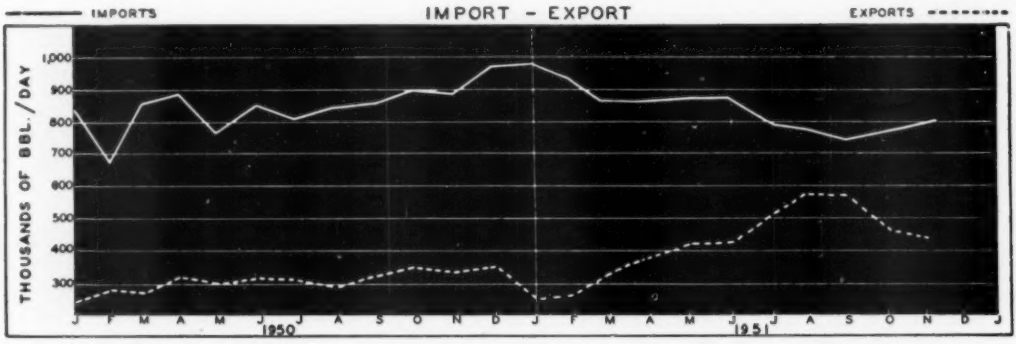


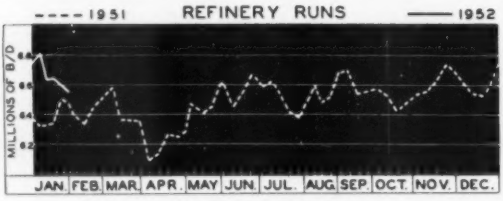
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

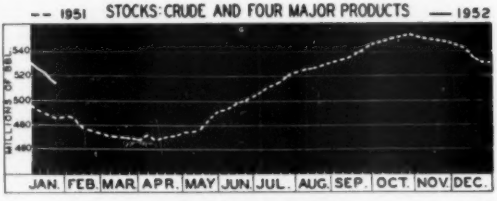
(Thousands of barrels)

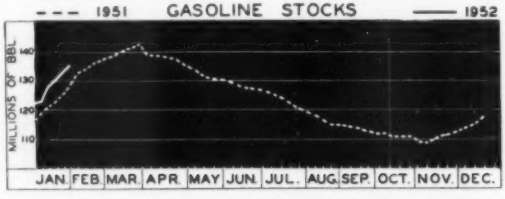
	Jan. 26, 1952	Jan. 19, 1952	Jan. 27, 1951
Pennsylvania Grade	2,017	2,104	2,102
Other Appalachian	1,800	1,755	1,261
Illinois, Indiana, Michigan	11,541	11,709	10,230
Arkansas	2,905	2,868	2,464
Louisiana	13,476	13,709	14,702
North	2,774	2,599	2,889
Gulf	10,702	11,110	11,813
Mississippi	3,371	3,369	3,656
New Mexico	7,182	7,315	6,937
Oklahoma and Kansas	39,409	39,971	38,446
Texas	121,282	121,083	114,387
East Texas Proper	11,179	10,909	(†)
West Texas	55,099	55,306	(†)
Texas Gulf	25,030	24,782	(†)
Other Texas	29,974	30,086	(†)
Rocky Mountain	13,873	14,009	12,302
California	29,967	29,868	31,289
Foreign	6,363	6,564	6,454
Total	253,186	254,324	244,230

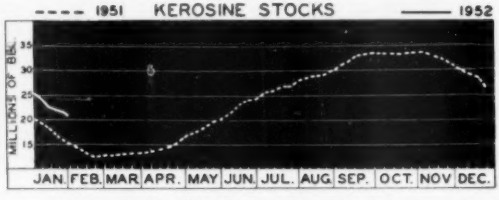
*Bureau of Mines. †Not comparable with current week.

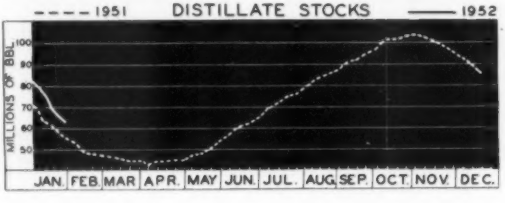


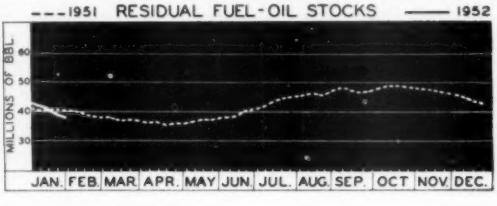










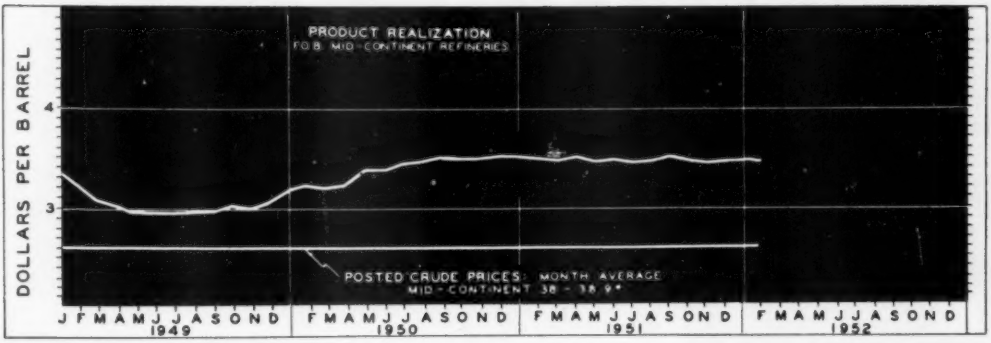


A.P.I. REFINERY REPORT, FEBRUARY 2

(Thousands of barrels)

District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, February 1951				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production			
											Gasoline*	Kerosine	Distillate	Residual
East Coast	933	383.4	45.7	232.4	240.3	24,423	7,417	18,559	9,291	1,008	376.6	53.0	255.2	244.1
Appalachian:														
District 1	104	50.7	5.7	19.7	15.6	3,007	447	662	496	98	38.8	4.8	19.1	13.1
District 2	80	37.9	5.3	11.6	14.8	1,325	182	298	158	80	34.1	5.2	10.4	20.5
Ind., Ill., Ky.	1,260	655.3	85.8	232.3	173.3	31,831	4,395	12,136	5,362	1,256	613.5	81.1	254.3	198.7
Okla., Kans., Mo.	541	301.1	18.0	129.9	54.8	15,199	1,178	7,963	1,506	542	276.8	17.0	131.7	80.9
Inland Texas	235	159.9	19.9	39.1	36.8	5,243	393	1,130	1,000	230	136.8	13.6	35.0	45.8
Texas Gulf Coast	1,616	750.9	121.4	377.0	252.3	23,058	3,184	10,515	6,104	1,538	636.5	143.0	371.7	268.6
La. Gulf Coast	510	204.1	62.0	130.4	62.0	7,944	1,954	2,844	1,959	507	227.7	69.0	130.2	70.7
N. La. and Ark.	78	34.0	7.3	16.6	7.7	2,824	447	1,099	157	80	29.4	8.3	20.7	9.9
Rocky Mountain:														
New Mexico	17	9.7		2.3	3.9	157		57	34	15	7.9	.5	2.5	3.7
Other Rocky Mtn.	221	108.9	7.3	44.4	46.6	5,152	255	1,641	1,033	221	107.8	8.2	41.5	49.1
California	950	385.0	1.9	173.7	362.0	15,731	249	5,486	10,976	986	419.9	6.1	147.0	376.9
February 2, 1952	6,545	3,080.9	380.3	1,409.4	1,270.1	135,894	20,101	62,390	38,076	6,562	2,905.8	409.8	1,419.3	1,382.0
January 26, 1952	6,584	3,092.7	409.3	1,484.4	1,317.4	133,861	21,180	66,450	38,725					
February 3, 1951	6,395	2,854.4	400.1	1,397.9	1,365.9	129,700	15,634	56,776	40,371					

*At refineries including natural blended. †Finished and unfinished.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.47 for week ended January 26, $3.47 for previous week, and $3.52 for January 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of February 6, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10-10¼	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11-11⅜	13.5-13.75	11¾-12
42-44 w.w. kerosine	9-9¼	10-10.1	9
No. 2 straw fuel oil	8-8⅜	9-9.25	8
No. 6 residual	$1.50-1.65	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

PRODUCT markets in the Mid-Continent area have not improved in the past week. Some No. 2 distillate was reported offered at a price well under the low, but buyers did not show much interest in the offering. Rumored sales of heavy fuel for movement to the Gulf Coast at low netback to Mid-Continent refiners include a transaction involving about 200,000 bbl. and another for about 100,000 bbl.

This oversupply of residual for inland areas is not confined to small refiners who normally sell a large part of their heavy-fuel output on the spot market. Some of the larger refiners had covered projected production of residual fuel as early as last summer only to find that shipments against contracts this winter have dropped enough to cause increases in residual inventories at a time when these stocks should be going down.

High demands for residual on the Gulf Coast will absorb all of the excess material at inland refineries, but Gulf Coast price ceilings result in very low netbacks for refiners in Oklahoma. The world shortage of residual has given Gulf Coast export demand such a boost that some of the buyers for export would be willing to pay as much as $2.10 a barrel for residual at the gulf if price ceilings were adjusted to that level.

Some Oklahoma refiners are trying to work out an adjustment in freight rates that will permit shipments to the Gulf Coast during the emergency with enough netback to encourage a larger movement to help cover part of the world shortage. Almost all of the surplus production in the inland areas of Texas has been sold for gulf movement, but refiners in these areas have an advantage in lower freight rates to tidewater points. For normal shipments to northern areas, these refiners would pay higher rates than Oklahoma operators.

The gasoline war in New Jersey has spread from service-station sales to consumer tank-wagon deliveries. In northern New Jersey, consumer tank-wagon prices have been cut about 5 cents a gallon, bringing them down to dealer tank-wagon level.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

EQUIPMENT MEN . . . in the News

Pullman-Standard to Open New Industrial Show Room

A new industrial show room featuring the products and activities of Pullman-Standard Car Manufacturing Co., and other subsidiary companies of Pullman, Inc., were opened to the public on January 21, Champ Carry, president of Pullman, Inc., has announced.

Charles W. Bryan, president of Pullman-Standard Manufacturing Co., and Champ Carry, president of Pullman, Inc., discuss new industrial show room over mammoth tire of 12-yd. scraper, largest unit displayed.

Panel and floor exhibits and display stations in the 3,600-sq. ft. show room portray the part played in transportation and industry by Pullman-Standard, builder of railroad freight and passenger cars; The M. W. Kellogg Co., designer and builder of petroleum refining and chemical processing plants, and Trailmobile, Inc., second-largest maker of highway truck trailers.

Largest of the floor exhibits is a huge Pullman-Standard 12-yd. scraper used in earth-moving work. Displayed as motive power for the scraper is an International Harvester diesel tractor equipped with a Pullman-Standard bulldozer. Other displays of earth-moving equipment include cutaway models of a Winchoist and a cable control unit for use with a cable-operated bulldozer.

Along the south wall of the show room are panel exhibits of Kellogg and Trailmobile products and operations. Featured as a floor exhibit is a scale model of a Trailmobile tandem axle for truck trailers.

A display of The M. W. Kellogg Co. in the new industrial show room in Chicago, portraying the diversified activities of Pullman, Inc.

Southern Geophysical Buys Outstanding National Stock

Dr. Sidon Harris, president of Southern Geophysical Co., Fort Worth, has purchased all of the company's outstanding stock, formerly held by National Geophysical Co. and associates of Dallas.

Southern's board of directors is now composed of Dr. Harris, chairman, and the following directors: R. H. Dana, W. D. Baird, R. E. Davis, E. F. Blake, L. R. Sarazan and E. G. Aycock.

Officers of Southern are: Dr. Harris, president; Dana, Baird, Davis, and Blake, vice presidents; Sarazan, secretary; and Collins M. Burton, assistant secretary and treasurer.

Davis is in charge of the West Texas-New Mexico division, with offices in Midland, Tex., and Blake heads the recently established Rocky Mountain division with headquarters in Denver.

Avondale Makes Notable Gain in Over-All Activities

During 1951 Avondale Marine Ways, Inc., showed a consistent and substantial increase in production in its over-all activities. An example is the past year's activities of Avondale's Harvey "Quick Repair" plant. In 12 months of 1951 ending December 31 Harvey serviced a total of 2,655 vessels and the number drydocked was 905, maintaining a high average and large volume output.

The recent acquisition by Avondale of all plants and facilities of Service Foundry, New Orleans, is characteristic of the company's continued progress.

A brief and partial summary of Avondale's production activities for the past year includes about 50 barges of all types, several towboats and harbor tugs, several large capacity submersible drilling barges, and miscellaneous equipment such as tanks, pressure vessels, flood gates, marine equipment and steel structurals.

Paltridge Is Appointed Sales Vice President

RECO Products Division of Refrigeration Engineering Corp. has announced the appointment of H. H. Paltridge as vice president in charge of sales and assistant to the president.

Paltridge has been associated with the Refrigeration and Air Conditioning Industry in design, production, field construction, and sales continuously since 1931 with the exception of 3 years spent in World War II.

Since 1948 Paltridge has been New York district manager for Baker Refrigeration Corp. and will continue in this capacity with the assistance of an increased staff.

Williamson Names Crandall To Engineering Department

T. D. Williamson, Inc., has announced the employment of Fred B. Crandall as development engineer, in its engineering department.

Crandall is a graduate of Iowa State College, Ames, in mechanical engineering. In 1948, following 3 years of Army service in World War II, he was employed by Phillips Petroleum Co., Bartlesville, Okla., products pipe-line department, as pipe-line engineer. He resigned to accept his present position.

Homestead Valve Names Field Personnel Changes

Don H. Krey, general sales manager for Homestead Valve Manufacturing Co., has reported the appointment of Fred Schuchman and James E. Seifert as field sales manager for the company's Hypressure Jenny Divsion.

Formerly national accounts representative, Schuchman will be in charge of the eastern district. Seifert has been moved up from sales promotion manager to management of the central district.

Garrett E. Winner has been advanced to fill the post of sales promotion manager.

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FOR SALE: Seamless casing and tubing, new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: One super model Wilson single drum servicing unit, 80 hp. Waukesha, 4,000' wire, all tubing tools, mounted on GM 4-wheel drive truck. $3500. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: One 125 H.P. Allis-Chalmers 1170 RPM 220 Volt, 31 Amphere, Type A.R. code F, 3 phase, 60 cycle, 24 hour, 40 degree rise induction electric motor. Never used. In original crate, priced at $1500.00. Located Cushing Refinery, Cushing, Oklahoma. Contact Huitt, Deep Rock Oil Corporation, Box 1051, Tulsa, Oklahoma.

FOR SALE: Model 61 Wichita Spudder, complete with 150 H.P., LeRoi Drilling Engine, all tools, dog house, light plant, and Shear Pole Mast. Rig is mounted on 12" I Beam Skids. Located in West Texas. Box E-559, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE
LINE PIPE COUPLINGS

2", 2½", 3", 4", 6", 8", 10"—140D Drive 14" OD, Casing 5½" OD 8 Rd. and 11½V NEW, CLEAN, PERFECT.

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1—260,000 bbl. riveted tank, can be reset as a floating top.

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PROPANE PLANT

Complete plant, Vaporizing and Mixing Equipment, including 18,000 gal. storage capacity in 3—6000 gal. tanks, ASME U69, 200 PSI WP.

PRESSURE VESSELS

11,000 gal. 93"IDx35' OA, 300 PSI test.
8,200 gal., 6'x46'x2", 390 PSI.
3,500 gal., 5'x23'x¾", 200 PSI (4).
2,000 gal., 5'x13'7½", 106 PSI.
1,250 gal., 4'x14', 106 PSI.
1,200 gal., 42"x16'8"x5/16", 125 PSI, ASME U69.
1,050 gal., 4'x12'x½", 106 PSI.

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Machinery & Equipment Merchants

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7500' OF API Full Hole 4½" Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. Geo. R. Milner, Box 124, Okmulgee, Oklahoma.

FOR SALE at W. C. Norris Plant, Tulsa: 1,813 new 5½" OD 8 Round Thread ABIJ55 National Tube Seamless Steel Casing Couplings, Price $5.00 ea., all or any portion, Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE: U-34 Unit Rotary Rig, C-150 pump, 5½' substructure, Lee C. Moore mast, 4200' of 4½" drill pipe, all complete, A-1 condition, eleven months old. H. Waggoner Drilling Company, Box 4657, Oklahoma City, Okla.

EVERYTHING in Cable Drilling tools, new-used, 4600 items. Send for list. Tri-State Tool & Supply Co., Box 827, Parkersburg, W. Va.

FOR SALE: Four Mayhew 1000 drills, two on 1948 International, one on 1950 Ford, all with water trucks, pipe and on good contracts. Box E-593, The Oil and Gas Journal, Tulsa, Okla.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

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Model 658 Franks w/ rotary drive mounted 10 ton White Truck w/ Cummins Diesel engine, 87' twin pole mast w/ racking board, five sheave crown, 5'8" sub-structure, McKissick double sheave block, King swivel, B-J Hook, 5x10 mud pump, skid mounted, transmission drive. Complete line of tools. Rig bought new, seven months service. Working near Houston.

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8—Used 10' ID dia. x 40' seam to seam x 3" shell. Code constructed all weld. Heads 3½". Test Pressure 900 psi. WP 600 psi.

7—Used 10' ID dia. x 40' seam to seam x 2½" shell. Code constructed all weld. Heads 3". Test Pres. 750 psi. WP 500 psi.

8—Used 8' ID dia. x 40' seam to seam x 2" shell. Code constructed all weld. Heads 2¼". Test Pressure 750 psi. WP 500 psi.

1—Used 6' ID dia. x 40' seam to seam x 2" shell. Code constructed all weld. Heads 2¼". Test Pressure 750 psi. WP 500 psi.

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Propane, Butane, Natural Gasoline

Unit No.—10A. Quantity—1. Description—Propane; Code welded; size 7-0 x 40-0; Cap. 12,000 gal; Horizontal; Shell thickness .781"; Heads 1.125"; W. Pressure 225 PSI @ 460° Temp.; Test Pressure 340 PSI; mounted on structural steel tank supports.

Unit No.—11-13. Quantity—3. Description—Butane; Code welded; size 6-3 x 35-0; Cap. 7,500 gal.; Horizontal; shell thickness .625"; Heads .750"; W. Pressure 150 PSI; Test Pressure 300 PSI; mounted on concrete saddles.

Unit No.—14-19. Quantity—6. Description—Casinghead Gasoline Storage; Cap. 8,000 gal.; riveted; Horizontal; Size 7-0 x 27-0 x ¼; mounted on concrete saddles.

Unit No.—22. Quantity—1. Description—Steel Storage Tank; Cap. 12,000 gal; Vertical; Riveted; size 10-0 x 20-0 x ¼ (Mineral Seal Service)

Unit No.—23. Quantity—1. Description—Steel Storage Tank; Cap. 8,500 gal. Welded, Vertical; size 10-0 x 15-0 x ¼ (Lube Oil Service)

Unit No.—24. Quantity—1. Description—Steel Storage Tank; Cap. 1600 bbls; Bolted type; size 16-0 x 27-0 (Water Storage Service)

Unit No.—25. Quantity—1. Description—Steel Storage Tank; Cap. 2400 bbls; Bolted Type; size 24-0 x 27-0 (Cooling Tower Water Storage)

Unit No.—83. Quantity—1. Description—Steam Hot Well Storage Tank; Cap. 3500 gals; size 6-0 x 14-0 x ⅜

Unit No.—86. Quantity—1. Description—Air Tank; 3-0 x 17-0 x ⅜; Riveted; Butt Strapped; 300 lb. W.P.

COMPRESSORS—ENGINES

Unit No.—1. Quantity—1. Description—Clark Gas Engine & Compressor; size 17 x 18 x 26 x 20; Ser. 9556; 230 BHP; 125# PSI Discharge

Unit No.—2-3. Quantity—2. Description—Clark Gas Engines, Gas Compressor; size 17 x 18 x 24 x 20; Ser. 9554 & Ser. 9558; 230 BHP, 125# PSI Discharge

Unit No.—4. Quantity—1. Description—Clark Gas Engine, Gas Compressor; size 16 x 7' x 10 x 20; Ser. 7495 VS; 200 BHP; 300# PSI Discharge; Propane Recompressor Service

Unit No.—5. Quantity—1. Description—Bessemer Gas Engine, Gas Compressor; size 17 x 6¼ x 16 x 20; Ser. 35886; 165 BRP; 180 RPM; Partially dismantled but complete with all parts available

Unit No.—6. Quantity—1. Description—Clark Gas Engine Compressor; size 16 x 8½ x 20; Ser. 541; 80 BHP; 180 RPM; 300 PSI Discharge; Make Tank Recompressor

Unit No.—7. Quantity—1. Description—Clark Gas Engine Compressor; size 16 x 7½ x 20; Ser. 544; 80 BHP; 180 RPM; 300 PSI Discharge; Connected to this unit is a Quincy Air Compressor; size 5¼ x 3 x 3½, 2 stage, belt drive; 300 PSI Discharge

Unit No.—8. Quantity—1. Description—Clark Gas Engine "Bob Cat"; 40 HP Vertical Type; Ser. 13156; V-Belt Drive, Connected to Ingersoll-Rand Compressor; size 5 x 11 x 10, 2 stage, Horizontal Type, Ser. 75940-1; Suction 14.7; Starting Pressure 500-lbs.; Working Pressure 300-lbs. (Air Mixture Residue Gas)

Unit No.—9. Quantity—1. Description—Clark Gas Engine "Bob Cat"; 40 HP Vertical Type; Ser. 13139; Size 7" x 9; V-Belt Drive, Connected to Gardner-Denver Centrifugal Pump; size 8, Type 6, Cap. 2000 GPM; Ser. 259038; (Cooling Tower Service)

Unit No.—10. Quantity—1. Description—Curtis Air Compressor; size 4 3/16 x 2⅛ x 3½; Ser. 9583; 2 stage; Direct connected to Briggs-Stratton gasoline engine; Model YY, Ser. 308110; size 5 HP

CENTRIFUGAL PUMPS

Unit No.—26. Quantity—1. Description—Worthington Cent. Pump; Cap. 300 GPM; size 3 x 3; Ser. 815892. Direct connected to Terry Turbine; Type ZA, Ser. 14843; Can be operated by Exhaust steam or gas. Connected to 8 coil Superheater consisting of 8 lengths of 4" Std. Pipe 20-0

Unit No.—27. Quantity—1. Description—Worthington Cent. Pump; Cap. 150 GPM; 130 TDH; size 2½" Ser. Q209A; Direct connected to Century Electric Motor, 5 HP, 1750 RPM, Single Phase, 110 V., Ser. 65489 (Cooling Tower)

Unit No.—28. Quantity—1. Description—Worthington Cent. Pump; size 4-L-1; Ser. 1011752; Direct connected to Coppus Steam Turbine, Type TF, Ser. 29073, 17 HP, 1750 RPM, size 16, Type TF6 Nozzles (Engine Cooling Tower)

Unit No.—29. Quantity—1. Description—Worthington Cent. Pump; size 4-L-1; Ser. 1022196; Direct connected to Howell Electric Motor, 7½ HP; 220 v.; Single Phase, 60 cycle, 1740 RPM, Ser. 51766 (Engine Cooling Tower)

Unit No.—30. Quantity—1. Description—Worthington Cent. Pump; Cap. 800 GPM; 6" suction; 4" discharge; Direct connected to Sturtevant Steam Turbine, Type 6, #144811, suction 1½", discharge 1"

Unit No.—32. Quantity—1. Description—Berke Co. Cent. Pump; size 1½ x 1¼; Fig. V3C28; Ser. 167123; Direct connected to ½ HP Electric Motor (Boiler Feed Service)

Unit No.—33. Quantity—1. Description—Worthington Monoblock Pump; size 2½ x 2; Ser. B111348-5; Direct connected in single assembly to Master Electric Motor, Explosion Proof Type; 20 HP, 3 Phase, 60 cycle, 350 RPM; Style 98y, Type P.A.

Unit No.—34. Quantity—1. Description—Bingham Pump; Ser. 9918; Directed in single assembly to General Electric Explosion Proof Motor, 20 HP, 3500 RPM, 3 Phase, 60 cycle, Ser. 5578674

RECIPROCATING STEAM PUMPS

Unit No.—37. Quantity—1. Description—National Transit Duplex; 10 x 7 x 12; Ser. 22430; Inlet 4"; Discharge 4"; (Oil circulation)

Unit No.—38. Quantity—1. Description—Fairbanks-Morse Duplex; 4½ x 3 x 4; Ser. 58926; Inlet 2"; Discharge 1½" (Interstage)

Unit No.—39. Quantity—1. Description—Worthington HiVol Simplex; 6½ x 3 x 8; Ser. 931223; Inlet 2" Discharge 1½" (Propane Reflux)

Unit No.—40. Quantity—1. Description—National Transit Simplex; 6 x 4 x 10; Ser. 29803; Inlet 3"; Discharge 2½" (De-ethinizer Reflux)

Unit No.—41. Quantity—1. Description—Worthington HiVol Simplex; 8 x 5 x 12; Ser. 1052583; Durable Type; Suction 4"; Discharge 3" (Charge)

Unit No.—42. Quantity—1. Description—National Transit Duplex; 10 x 4½ x 10½; Ser. A-31256; Valve Pot Type; 4" Suction; 4" Discharge

Unit No.—43. Quantity—1. Description—National Transit; Simplex; 10 x 6½ x 12; Ser. 29804

Unit No.—44. Quantity—1. Description—National Transit; Duplex; 10 x 4½ x 10, Dwg. C-1625; Valve Pot Type; 4" Suction; 4" Discharge; (Boiler Feed)

Unit No.—45. Quantity—1. Description—Union Steam; Simplex; 10 x 6 x 12, Ser. 186488; 4" Suction; 3" Discharge; (Boiler Feed)

Unit No.—46. Quantity—1. Description—Dean Bros.; Simplex; 8 x 5 x 12; Ser. 49448; Durable Type; 4" Suction; 3" Discharge; Extra New Liquid End

TOWERS & VESSELS

Unit No.—55. Quantity—1. Description—Absorber; 4-0 x 34-0 x ⅜ Shell; Top Head ⅝"; Bottom Head 1¼ thick; 14 Trays ¼" Plate, 14-ga. B.A. Sheets; Bubble Caps Girth Seams double riveted outside;; Butt Strap Joints except Heads which are double riveted lap joint; Longitudinal joints double riveted; Bottom joint triple riveted; All seams welded inside and out; All rivets completely welded; Outside Test 450 PSI; W.P. 300 PSI; Tulsa Type Mist Extractor; Weight approx. 25,000 lbs.

Unit No.—62. Quantity—1. Description—Depropanizer; 3-0 x 48-0 x ½ shell; ⅝" Heads; 30 Trays-⅜" Plate; Downcomers 3/16" Plate; Seals ¼" Plate; 14-ga. B.A. Sheet Bubble Caps; 2" O.P. Risers and 1-18" Manway; Test Pressure 450 PSI; W.P. 300 PSI; Connected to reboiler 3-0 x 14-0; Containing 49 Steel U Tubes; 200 sq. ft.; Reboiler Shell ½"; Heads ⅝"; Welded construction; 300 PSI; Max. Temp. 650°; Made by Tulsa Boiler Works, Ser. 41150

Unit No.—67. Quantity—1. Description—Deni anizer; 2-0 x 50-0 x 5/16 shell; ⅜" Heads; 30 trays ¼" Plate; Downcomers 10-ga. sheets; Bubble Caps 14-ga. B.A. Sheet; Hydro Test 375 PSI; W.P. 250 PSI; Equipped with Reflux Condenser 2-8 x 4-0 x ⅜; Containing 346 Tubes ¾" OD x 3-0; 113 sq.ft.; Tubes 120 PSI; Shell 375 PSI; 3 pass

Unit No.—52-53. Quantity—2. Description—Field Scrubbers, 7-0 x 10-0 x ¼; Riveted, Vertical

Unit No.—54. Quantity—1. Description—Interstage Accumulator; 7-0 x 12-0 x ½; Welded, Vertical.

Unit No.—56. Quantity—1. Description—Residue Scrubber; 4-0 x 15-0 x ½; Riveted, Horizontal

Unit No.—57. Quantity—1. Description—Vent Tank; 5-0 x 20-0 x ⅜; 65 PSI; Temp 190°; Riveted

Unit No.—58. Quantity—1. Description—Still; 5-0 x 16-0 x ⅜"; Welded; 40 PSI; 330° Temp; Vertical; SW Eng. Co. Ser. 4901

Unit No.—59. Quantity—1. Description—Dephlegmator; 5-0 x 18-0 x ⅜; Welded; Vertical; 2 Trays; W.P. 45 PSI; Test 70 PSI; SW Eng. Co. Ser. 4900

Unit No.—60. Quantity—1. Description—Make Tank; 5-0 x 15-0 x 5/16; Welded; Horizontal.

Unit No.—61. Quantity—1. Description—Recompressor Scrubber; 2-7 x 8-0 x 7/16; 300 PSI; Welded

Unit No.—84. Quantity—1. Description—Water Leg. Make Tank; 2-7 x 8-0 x ½ Shell; Riveted; Vertical

Unit No.—85. Quantity—1. Description—Water Leg. Make Tank; 2-0 x 12-0 x ¼ Shell; Welded; Vertical

Unit No.—87. Quantity—1. Description—Water Leg. Scrubber; 3-0 x 10-0 x 5/16; Riveted; Vertical

Unit No.—88. Quantity—1. Description—Pressure Jet Tank; 5-0 x 21-0 x ¼; Riveted

Unit No.—64. Quantity—1. Description—Compressor Scrubber; 2-0 x 10-0 x 7/16; ⅜" heads; W.P. 300 PSI; Temp 100°; Welded

Unit No.—65. Quantity—1. Description—De-ethinizer; 1-0 x 19-0 x ⅜ shell; ½" heads; with Reboiler containing 36 tubes ¾ x 3-0; 21 sq.ft. Test Pressure Vessel 440 PSI; 220° Temp; Tubes 250 PSI; 400° Temp.

Unit No.—66. Quantity—1. Description—Reflux Accumulator; 1-0 x 10-0 x ⅜ shell; ½" heads; Design Pressure 440 PSI; Temp 100°

Unit No.—68. Quantity—1. Description—Reflux Accumulator; 2-0 x 10-0 x ⅜ shell; ⅜" heads; Welded; Vertical

Unit No.—69. Quantity—1. Description—Perco Treaters; 3-0 x 12-0 x 3/16 shell; ¼" heads; Design Pressure 105 PSI; Welded; Vertical

Unit No.—71-72. Quantity—2. Description — Caustic Wash Towers; 2-0 x 20-0 x ⅜ shell; ½" heads; Baffles ¼" Plate; Seamless; Vertical; W.P. 250 PSI

Unit No.—73. Quantity—1. Description—Propane Gravel Tower; 2-0 x 10-0 x ⅜ shell; ½" heads; Seamless; 250 PSI; Vertical

Unit No.—74-75. Quantity—2. Description—Propane Dehydrator Tank; 1-4 x 6-6 x ⅜ Seamless Shell; ⅜" heads; with 4 x 8 Mesh; W.P. 250 PSI; Vertical

Unit No.—77. Quantity—1. Description—Superheater Feed Tank; 1-4 x 10-0 x ⅜ Seamless Tank; ½" heads; 250 PSI

Unit No.—78. Quantity—1. Description—High Stage Accumulator; 4-0 x 11-0 x ⅜; Welded; Vertical; W.P. 250 PSI

HEAT EXCHANGERS

Unit No.—47-48. Quantity—2. Description—Southwestern; W.P. 100 PSI; Type HG 1250; size 52 x 30 x 44; Contains 1,280 tubes, Admiralty, ¾" OD x 2-6; Surface Area 630 sq.ft.

Unit No.—49-50. Quantity—2. Description—Southwestern; W.P. 100 PSI; Type H 750-48; sizes 30 x 36 x 60; Contains 1,536 tubes, Admiralty, ¾" OD x 4-6; Surface Area 750 sq.ft.

Unit No.—51. Quantity—1. Description—Tulsa Type Preheater 0-8 x 20-0 w/22 ¾" OD 14-ga. Seamless Steel Tubes; 162 sq.ft.; 250 PSI; Test in 3 sections; can be operated

(Continued on next page)

Salesman on premises. Contact R. V. Crisp, Telephone 1419 or 610, Benton, Illinois, or Norman Strauss, Kansas City, Missouri

BROWN-STRAUSS CORPORATION

Kansas City 10, Mo. **P. O. Box 78** **Harrison 1000**

(Continued from preceding page)

Unit No.—174. Quantity—1 lot. Description—Brass tube cooling sections as follows:

12 — 57 — 1" OD Tubes	20-0	295 sq.ft./sec.
19 — 36 — 1" OD Tubes	20-0	186 sq.ft./sec.
1 — 88 — 1" OD Tubes	20-0	450 sq.ft./sec.
1 — 92 — 1" OD Tubes	20-0	482 sq.ft./sec.
1 — 20 — 1" OD Tubes	20-0	104 sq.ft./sec.

TOTAL SURFACE — 8,110 sq.ft.

BOILERS

Unit No.—170-173. Quantity—3. Description—125 HP Broderick Co. locomotive type ASME Code; Boilers operated at 200 lbs. pressure; 98 Boiler Tubes 3" x 14-0; complete with Steel Stacks; fired by Sonner Mfg. Co. Gas Burners; fully equipped with all accessories ready for use. Insurance inspection certificates available.

COOLING TOWER

Unit No.—174. Quantity—1. Description—Atmospheric Cooling Tower—12-0 x 66-0 x 43-0; Lilie-Hoffman Mfr.; Fabricated of Pacific Coast Redwood, Brass Bolts, Nuts & Washers, Copper Nails, Ladder & Hand Rails, 11 Bays, each Bay having 10 Cooling Decks. Designed to cool 1,000 GPM; Brass Sections as follows:

12 — 57 — 1" OD Tubes	20-0	295 sq.ft./sec.
19 — 36 — 1" OD Tubes	20-0	186 sq.ft./sec.
1 — 88 — 1" OD Tubes	20-0	450 sq.ft./sec.
1 — 92 — 1" OD Tubes	20-0	482 sq.ft./sec.
1 — 20 — 1" OD Tubes	20-0	105 sq.ft./sec.

TOTAL SURFACE — 8,110 sq.ft.

VALVES and FITTINGS

Various Sizes and Types

BUILDINGS

Unit No.—175. Quantity—1. Description—Compressor Building 32-0 x 120-0 x 12-0 with 13 steel windows 4-10 x 7-0, 2 double slide doors and 1 pedestrian door; Fabricated of Pipe Trusses and covered with Corrugated Iron Siding; can be easily dismantled and re-erected.

Unit No.—176. Quantity—1. Description—Boiler House 20-0 x 50-0 x 10-0 with skylight length of building; Steel framing & covering; sectional and portable.

Unit No.—177. Quantity—1. Description—30-0 x 30-0 x 8-0 Wood Frame; Steel Corrugated Iron Covering

Unit No.—178. Quantity—1. Description—20-0 x 40-0 x 8-0 Wood Frame; Steel Corrugated Iron Covering

Unit No.—179. Quantity—1. Description—16-0 x 16-0 x 8-0 Wood Frame; Steel Corrugated Iron Covering

Unit No.—180. Quantity—1. Description—10-0 x 26-0 x 6-0 Wood Frame; Steel Corrugated Iron Covering

MISCELLANEOUS

Unit No.—164. Quantity—1. Description—General Electric Motor; 10 HP; Sec. KW 3668; 440 v; 1740 RPM; 3 Phase; 60 cycle

Unit No.—165. Quantity—1. Description—General Electric Motor; 50 HP; Ses. 3886613; 440 v; 1740 RPM; Type KH327

Unit No.—166-169. Quantity—3. Description—Fisher Governor; size 4"; new in original crate

Unit No.—79. Quantity—1. Description—Trident 2 Compound Water Meter; Ser. 5966975

PROCESS INSTRUMENTS

(all 24-hr. movements)

Unit No.—100-103. Quantity—3. Description—Bristol Free Vane Flow Controller: Model KR51140MF; Serial P3002; Chart F10000; Ser. F2716; Ser. F2717

Unit No.—104. Quantity—1. Description—Bristol Recorder; Model 40M; Serial 198881; Chart #4641; Range 0-200 PSI

Unit No.—105. Quantity—1. Description—Bristol Recorder; Model 40M; Serial 182209; Chart #4635; Range 0-50 PSI

Unit No.—106. Quantity—1. Description—Foxboro Recorder; Chart #79874; Range 0-250 PSI

Unit No.—107-109. Quantity—2. Description—Foxboro Temperature Controller & Recorder; Serial C34290; Chart #878330; Class 2; Range 50-300° F.

Unit No.—110. Quantity—1. Description—Foxboro Temperature Recorder; Serial C47810D; Chart #878379; Class 2; Range 50-200.

Unit No.—111. Quantity—1. Description—Foxboro Pressure Recorder; Serial C50913; Chart #89875; Type HS; Range 0-300 PSI

Unit No.—112. Quantity—1. Description—Taylor Temperature Recorder #76V1741; Chart #OP524; Range 80-300° F

Unit No.—113. Quantity—1. Description—Tagliabue Temperature Recorder; 0-500° F; Chart #50008

Unit No.—114. Quantity—1. Description—Taylor Temperature Recorder #76JM2208; Chart 200; Range 0-110° C

Unit No.—115. Quantity—1. Description—Tagliabue Temperature Recorder; Chart 200-0-8; Range 0-200° F

Unit No.—116. Quantity—1. Description—Foxboro Pressure Recorder #C79333; Chart #79809

Unit No.—117. Quantity—1. Description—Foxboro Temperature Controller & Recorder #B45879; Chart #778345; Class 2

Unit No.—118. Quantity—1. Description—Hanlon Waters Liquid Level Pilot Motor Valve Controllers Type 1410; 2 Indicators; 1 Gauge Diaphragm; 1 Gauge Supply, Both 0-30 PSI

Unit No.—119. Quantity—1. Description—Hanlon Waters Liquid Level Pilot Motor Valve Controller, Type 293

Unit No.—120. Quantity—1. Description—Hanlon Waters Pressure Pilot Controller, Type 275; Serials 11874, 11875, 11869, 11251, 11850, 10249, 11049, 10,962, 11857

Unit No.—121. Quantity—1. Description—Taylor Direct Acting Temperature Controllers, #7R1872 & #7R1873

Unit No.—122. Quantity—1. Description—Taylor Reverse Acting Temp. Controllers, #7R1872 & #7R1873

Unit No.—123. Quantity—1. Description—Fisher Pressure Controller, Type 4100 SR; Max. Pressure 75 PSI

Unit No.—124. Quantity—1. Description—Fisher Governor Wizard Control #676558; Type 4256A; size 1½"; stainless steel trim; ¾ valve travel; diaphragm 3-13 PSI; Pressure in Diaphragm opens Main Valve; Inner Valve Type DP V-Port

Unit No.—125. Quantity—1. Description—Fisher Governor Wizard Control #635770; Type 4256A; size 1¼"; stainless steel trim; ⅞" valve travel; diaphragm 3-12 PSI; Pressure in Diaphragm opens Main Valve; Inner Valve DP V-Port

MOTOR VALVES & KIDNEY FLOATS

Unit No.—126. Quantity—1. Description—Fisher Motor Valve #B34430; size 3" (Controlled Pressure on Butane Tower)

Unit No.—127. Quantity—1. Description—MacClear Motor Valve; size 3" (Controlled Pressure on Absorber)

Unit No.—128. Quantity—1. Description—Fisher Motor Valve; size 2" (Repressuring Gas Wells)

Unit No.—129. Quantity—1. Description—Chaplin Fulton Motor Valve; size 3", lever operated (Controlled back pressure on Residue)

Unit No.—130. Quantity—1. Description—Tracyfire Steam Drier; size 2"; #7818 (Agitated Still)

Unit No.—131. Quantity—1. Description—Hanlon Waters Motor Valve; size ¾"; 300 PSI @ 450° F; Diaphragm Pressure 2-15 PSI; #22323; Valve travel ¼"; Type Inner Valve SPNB (Controlled Liquid Level Propane Reboiler)

Unit No.—132. Quantity—1. Description—Hanlon Waters Motor Valve; #20192; size ¾"; Type KA2; Valve travel ¾"; Type Inner Valve SPRAD; (Controlled Steam Temp #1 Reboiler)

Unit No.—133. Quantity—1. Description—Hanlon Waters Motor Valve; Type 86D; #24218; 2-15 PSI; Diaphragm Pressure; size 1"

Unit No.—134. Quantity—1. Description—Hanlon Waters Motor Valve; Type KA2; #20397; size 1"; 250 PSI @ 450° F; ½" valve travel; Type inner Valve SPPF; 2-15 PSI Diaphragm Pressure (Controlled Liquid Butane Reboiler)

Unit No.—135. Quantity—1. Description—Hanlon Waters Motor Valve; Type KA2; #20194; size 1¼"; Type Inner Valve DPRHD (Controlled Steam Butane Reboiler)

Unit No.—136. Quantity—1. Description—Fisher Motor Valve; Type 57; #486883; size 1"; (Controlled Steam #1 Reflux Pump)

Unit No.—137. Quantity—1. Description—Fisher Motor Valve; Type 555; #771561; size ¾"; stainless steel trim; 7/16" valve travel; 2-15 PSI Diaphragm pressure; Type Inner Valve DP-V-Port (Controlled Speed De-ethinizer Reflux Pump)

Unit No.—138. Quantity—1. Description—Taylor Motosteel Motor Valve; size ¾"; #2V7013 (Controlled Reflux to Dephlegmator)

Unit No.—139. Quantity—1. Description—Hanlon Waters Motor Valve #27326; size 1"; Type 86D; 2-15 PSI Diaphragm Pressure; 400-500 PSI W.P.; ¾" Valve travel; Type Inner Valve SPRAD (Controlled Pressure of De-ethinizer)

Unit No.—140. Quantity—1. Description—Hanlon Waters Motor Valve #25802; Type 86D; size 2"; 250-450 PSI W.P. Type Inner Valve DPRAD (Controlled Pressure of De-ethinizer)

Unit No.—141. Quantity—1. Description—Fisher Kidney Float; operated pilot valve which operated Fisher Motor Valve; size 3"; #B128882 (Absorber Input)

Unit No.—142. Quantity—1. Description—Fisher Motor Valve; Type 235C; #429548; size 4"; (Pressure Control for Make Tank)

Unit No.—143. Quantity—1. Description—Chaplin Fulton Back Pressure Regulator; size 1" (Butane Accumulator)

Unit No.—144. Quantity—1. Description—Hanlon Waters Kidney Float #27317; Style KA2; Type KA2; 125 PSI @ 450° F; size 1½" (Butane Accumulator)

Unit No.—145. Quantity—1. Description—Hanlon Waters Kidney Float #38548; Trim KA2; Type 850; size 2"; 350 PSI @ 750° F (De-ethinizer Service)

Unit No.—146. Quantity—1. Description—Hanlon Waters Kidney Float #20952; Type 850; size 1¼"; 250 PSI @ 450° (Propane Reflux Accumulator)

Unit No.—147. Quantity—1. Description—Mercoid Swing Check #438376; Ratio PSH 18; RI 1/6; DC 1/6; 115/230 v.; 4 amp; (Shut down Propane Recompressor if Scrubber filled)

Unit No.—148. Quantity—1. Description—Fisher Kidney Float; size 1½" w/pilot (Still)

Unit No.—149. Quantity—1. Description—Fisher Water Trap; size 1½"; float type (Dephlegmator)

Unit No.—150. Quantity—1. Description—Hanlon Water Kidney Float; gas oil service; 300 PSI @ 750° F; Trim KA2; size 1½"; #38547

Unit No.—151. Quantity—1. Description—Fisher Motor Valve #42705; Type 57; size ½"; 5-14 PSI Diaphragm Pressure (Liquid Level Controller for De-ethinizer)

Unit No.—152. Quantity—1. Description—Fisher Motor Valve #791838; Type 57T; size ½"; stainless steel trim; ⅜" valve travel; 0-13 PSI Diaphragm Pressure; Type Inner Valve D-SP Plug (Control Feed Propane Tower) ⅜" Valve travel

Unit No.—153. Quantity—1. Description—Chaplin Fulton Motor Valve; size ¾" (Reflux Butane Tower)

Unit No.—154. Quantity—1. Description—Taylor Motosteel #2V700TU; size ½" (Level Reflux Accumulator)

Unit No.—155. Quantity—1. Description—Hanlon Waters Kidney Float #27325; trim KA2; Style 850; 300 PSI @ 450° F (Control Level Make Tank)

Unit No.—156. Quantity—1. Description—Steam Trap; size ½" (Butane Reboiler)

Unit No.—157. Quantity—1. Description—Steam Trap; size ¾" (Propane Reboiler)

Unit No.—158. Quantity—1. Description—Steam Trap; size 1" (Steam Line Dead End)

Unit No.—159. Quantity—1. Description—Hanlon Waters Kidney Float #20193; Style KA2; Type 850; 300 PSI @ 450° F; size 1½" (Control Level Propane Reboiler)

Unit No.—160. Quantity—1. Description—Hanlon Waters Kidney Float #26529; Style KA2; Type 850; 250 PSI @ 450° F; size 1½" (Control Level Butane Reboiler)

Unit No.—161. Quantity—1. Description—MacClear Motor Valve; size 3"

Unit No.—162. Quantity—1. Description—Maxim Silencer; #20 Model MVC 213754; 2-8 x 8-0; size 10"

Unit No.—163. Quantity—1. Description—Fisher Kidney Float #426005; size 1½"; operated Foxboro Motor Valve; size 1" (Accumulator Service)

FIELD GAS METERS

Unit No.—170-177. Quantity—7. Description—New Type—Westcott Orifice Meter #84710; 20 PSI Static Pressure; 20 PSI Diff.; Chart #M305T; 2 Pen; Mfg. by American Meter Co.; 7 day movement

Unit No.—178. Quantity—1. Description—Old Type—Westcott Recording Diff. & Satic Pressure Gauge #1599; Static Pres. 500 PSI; Diff. 50 PSI; Chart M3054; 7 day mvt.

Salesman on premises. Contact R. V. Crisp, Telephone 1419 or 610, Benton, Illinois, or Norman Strauss, Kansas City, Missouri

BROWN-STRAUSS CORPORATION

Kansas City 10, Mo. **P. O. Box 78** **Harrison 1000**

EQUIPMENT FOR SALE

BETHLEHEM MC 250 drawworks, V belt compound with twin disc clutches, D-13,000 Caterpillars. Located at Duncan, Oklahoma. Keating Drilling Co., Midland, Texas, Phone 2-2473.

FOR SALE at our Sasakwa Gasolene Plant, Section 7-6N-8E, Seminole County, Oklahoma. 10 miles South of Wewoka and 1 mile East of Highway 56—4 24′ x 28′ carpenter built, modern houses, 4 room $2250.00 each plus tax. 1—3 room, $750.00 plus tax. All to be moved. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE by owner: 5,000′ rotary rig now running vicinity Wichita Falls, Texas. 96′ jackknife derrick w/ 5′ substructure, Wilson Giant drawworks w/ WAK Waukesha, new 220hp 212p Oilwell pump w/ V8 LeRoi 17″ Oilwell rotary, Brewster H100 block & hook, 4000′ 4½″ full hole drill pipe. Complete equipment A-1 condition. Gray Drilling Company, 306 First National Bank Building, Wichita Falls, Texas. Phone 7292, 26158.

FOR SALE

Gas Compressor Station complete consisting of 2—Cooper Model 80 Twin 170 Hp. Gas Engine Compressors complete with building, air fin jacket water coolers, air compressor, 5′ x 15′ Inlet scrubber, other accessories and 12,000′ of 6″ and 8″ pipe. Plant operated only three months after being constructed of completely reconditioned engines and new auxiliaries. Location, Kansas.

Box E-578, The Oil and Gas Journal, Tulsa, Oklahoma

FOR SALE
USED SEAMLESS STEEL TUBING
PLAIN AND BEVELED FOR WELDING

Ready for IMMEDIATE SHIPMENT

150,000 ft.—1½″ O.D. weighing approx. 2.14# ft.
100,000 ft.—2″ O.D. weighing approx. 2.67# ft.
125,000 ft.—2¼″ O.D. weighing approx. 3.00# ft.
50,000 ft.—3½″ O.D. weighing approx. 5.00# to 5.50# ft.
120,000 ft.—4″ O.D. weighing approx. 5.75# to 6.00# ft.
75,000 ft.—5⅜″ O.D. and 5½″ O.D. weighing approx. 10.00# ft.

(This 5⅜″ and 5½″ can be used as casing in shallow wells)

This material has never been underground, was formerly used for steam purposes, shows practically no pitting, every length will be tested for 850# hydrostatic pressure at our plant.

We carry large stocks of new and guaranteed used steel pipe and tubing up to 30″ in diameter.

We have a large quantity of welded, riveted and bolted STEEL TANKS, in both new and used, suitable for regular storage and pressure. Also Wood TANKS, formerly used for beer storage.

Your inquiries will be appreciated.

A. GREENSPON PIPE CO., INC.

(In "Our 77th Year")

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EQUIPMENT FOR SALE

FOR SALE: 15 new International Model U-9 Power Units equipped with Ensign Combination Carburetor, Twin Disc Clutch, Automatic Oil and Water Cut-Offs, Hood and Side Doors. Dealers' Cost. Call or write Jack Anderson Engine Company, Telephone No. 2021, Post Office Box 1290, Kilgore, Texas.

12,000′ OF GOOD Used 6⅝″ O.D. 18.97 Line Pipe, some with collars just taken out of a line; 18,000′ of 4½″ O.D. 10.79# some with collars; 7,500′ of 3½″ O.D. T. & C. Std. will sell or trade for other Pipe. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

1—PDM 36 Emsco DWKS w/ 2-R61 Climax Engines, Drill Pipe, Collars, Kellys, Crowns, Rotary Tables, Traveling Blocks. Chapman Pipe & Supply, Oklahoma City, Okla. Ph. ME 8-1567, WI 3-0300.

FOR SALE: 24 L Bucyrus Erie, Butane equipped, 1,000 gallon Butane tank, complete string of tools, Spang fishing tools, New lines, 300 feet of 10″ casing, 800 feet of 8″ casing, 850 feet of 7″ casing, 1100 feet of 5½″ casing, all J 55 seamless range 2, ran once. Oil field truck, all guaranteed A 1 condition. Address John I. Cooper, General Delivery, Owensboro, Ky.

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TUBULAR GOODS

Completely, equipped, well established fabricator has production time available to convert your seamless tubing and pipe by upsetting, threading and hydrostatic testing, to A.P.I. Specifications.

Plant location is on main line railroad within the Pittsburgh switching zone.

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WE ARE OFFERING FOR SALE
Subject to Inspection
A completely Staffed
SERVICING COMPANY

Including: Six pulling units valued at $34,525 consisting of Wilson Junior, single drum, 40-ft. pole, driven by power-takeoff, mounted on 1948 Ford 1½ ton, will handle approx. 1500 ft. of 2″ tubing or 2700 ft. rods; Allis-Chalmers, powered with Ford V8 engine, single drum, 45 ft. pole, mounted on 1946 Ford 1½ ton, will handle approx. 3600 ft. 2½″ tubing or 5000 ft. rods; Wilson double-drum Sr. powered with Ford V8, 45-ft. pole, mounted on 1948 F7 Ford, will handle approx. 3600 ft. 2½″ tubing or 5000 ft. rods; C-60 Wichtex, double drum, powered with HP 326 Buda engine, 48-ft. double pole, mounted on 1942 GMC 2½ ton, will handle approx. 4000 ft. 2½″ tubing or 6000 ft. rods; Super Wilson, double drum, powered with MZR Waukesha, 50-ft. double pole; mounted on 1951 LF190 International tandem, will handle approx. 6500 ft. 2½″ tubing or 12,000 ft. rods; C-65 Wichtex, double-drum, with spudder attachment, powered with K-428 Buda, 52-ft. double pole, mounted on 1945 Studebaker tandem 6 x 6, will handle approx. 10,000 ft. 2″ tubing; Plus tubing and cable tools, buildings on 2-acre fenced yard, eight vehicles, shop and maintenance equipment, and truck replacement parts. Detailed descriptions available. **Box E-581, The Oil and Gas Journal, Tulsa, Okla.**

EQUIPMENT FOR SALE

FOR SALE: Shot Hole Rig—Franks KC 45—mounted on Tandem Chevrolet. Water truck 1951 Dodge—700 gal. Griffin tank. 200 ft. drill pipe, complete and in excellent condition. E. E. Hubbard, Phone 4926, 1206 N. 11th, Garden City, Kansas.

FOR SALE: Wilson Giant Draw Works with 2—Buda JL-1335 Motors Compounded; 2—Code Butane Tanks. All complete ready to run. May be inspected while drilling 4000′ wells near Hayes, Kansas. Delivery about March first. Total price $11,000.00. Powell Drilling Company, 306 Derby Building, Wichita, Kansas.

AIR COMPRESSORS: Davey Model 160 V.D., 160 cu. ft., International Diesel powered; $2,250.00. Chicago Pneumatic, 160 cu. ft., Hercules Gasoline powered; $1250.00. Located Tulsa. Midwestern Drillers, 628 Wright Bldg., Tulsa, Oklahoma. Phone 4-5263.

FOR SALE: Several Tanks of 2,500—5,000 and 10,000 bbl. capacities. Immediate delivery and prompt erection. Atlas Tank and Steel Co., P. O. Box 2297, phone 4-7492, Tulsa, Okla.

3—122′ American Steel derricks with safety tops, 186,000 and 323,000 lb. capacity. Located near Hobbs, New Mexico. Degen Pipe & Supply Co., Box 107, Redfork Station, Tulsa, Oklahoma.

T & C Deep Well Gas Lift Pump. Capable of lifting 1250 bbls. per day from 8500 feet. Write Geo. L. Thompson, P.O. Bin J, Avenal, California.

2 E K U Waukesha Motors w/ Twin Disc Clutches A1 Condition, 450′ 6⅝″ OD Drill Pipe and Joints, 1 65″—5 Sheave Traveling Block, 1 56″—4 Sheave Traveling Block, 1 48″—4 Sheave Traveling Block, 1 58″—12 Groove Sheave (D), 1 56″—9E Groove Sheave, 1 30″—5B Groove Sheave, 1 70 H.P. Boiler, A 1, 2 Sets Compound Rotating Elements mounted on Skids, 1 26″ Gumbo Buster Rotary Table complete, A 1 Condition, 2 Model B 218 POO Drawing x 7189 Twin Disc Clutches, 2 1879 Buda Engine Fly Wheels, 1 4 Sheave Ideal Crown Block. H. M. Williams Drilling Company, 701 Bitting Building, Wichita 2, Kansas.

HEAT TREATER

8′x15′ BS&B, fully automatic with B-30 Fire Box ¼″x¼″x3/16″, insulated. Purchased new, in service 9 months $1,500 at location near McPherson, Kansas.

PUMPING UNIT

20hp. double reduction Bethlehem, beam capacity 13,000#, peak torque 97,800 inch pounds at 20spm 24″ to 54″ stroke, mounted long steel engine base $1,500 at location near McPherson, Kansas.

LEE F. CAPSHAW
452 Esperson Building Houston, Texas
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For Sale

3—100 H.P. Twin Cylinder Superior Gas Engine Driven Compressors, all cylinders rebored, otherwise completely repaired, and ready for shipment.

1—Type 80, 170 H.P. Cooper Twin Gas Engine Driven Compressor, now in shop being repaired. Can equip with compressor cylinders to suit purchaser.

1—Type 10 Bessemer 100 H.P. Single Cylinder. Can furnish compressor cylinder, any size.

3—Clark 100 HP Gas Engine Driven Compressor with 17″ Power cylinder and mechanical fuel economizers. Compression cylinders to fit requirements.

4—X.O.B. Ingersol-Rand Compressors.
2—10 x 4¼ x 10
2—11 x 5 x 10, will sell as is or will repair.

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Tel. 2-5473 205 Thompson Bldg.
Tulsa, Oklahoma

STEEL TANKS

Three Tanks: 25327 volume cubic feet, 180,000 gallon capacity. 35′-10″ high, 30′-0″ diameter. Weight 57,278 lbs., 5/16″ gauge, heating coils 300′-2″.

One Tank: 21,264 volume cubic feet; 170,000 gallon capacity. 30′-1″ height, diameter 30′-0″; weighs 49,675 lbs. Coils 300′-2″, 5/16″ gauge.

All in good usable condition.
Priced reasonable . . . Phone, wire or write

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EQUIPMENT FOR SALE

FOR SALE: Well Drilling Business—71-Star, Modernized #3 Keystone, Both Truck Mounted. Complete Tools, 4 to 20 inch. Physical Inventory $15,000. Nets $6,000 to $8,000 yearly. This is Industrial—No Pipe Worries. Sales Price: $11,000.00. Owner retiring. Write Box E-594, The Oil and Gas Journal, Tulsa, Oklahoma.

THREE 4¾" x 30' Drill collars. American overshot. One 9" x 25' Drill collar. One elevator for drill pipe. Kiowa Drilling Company, Inc., 717 Union National Bank Building, Wichita, Kansas.

FOR SALE
ENGINE AND GENERATOR

One, 150 KVA 220 Volt, 60 cycle, 3 phase, General Electric generator, Direct Connected to 185 H.P. Skinner Uniflow Engine with Exciter, Slate panel board and necessary computing instruments. This equipment is in fine operating condition. Price $6,000.00. F.O.B. care El Paso, Texas. Address inquiries to: Acme Laundry and Cleaners, 905 E. Missouri Street, El Paso, Texas.

EQUIPMENT WANTED

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WANTED: Triplex Type Pumps, minimum 500 barrels per day capacity at 1,000 PSI and 0 to 10 PSI suction and up. 1" Regular Black Line Pipe; 1" long collar line pipe and 1¼" upset tubing. Must be in good condition. Lynch Oil Company, P. O. Box 414, Evansville, Indiana

WANTED: Bucyrus-Erie 48 or Walker-Neer S-33 with or without tools. Box E-599, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES COMPANY in Western New York State established twenty years, interested in oil and gas equipment items for New York, Pennsylvania, Ohio, and West Virginia. Box E-572, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED to buy by Eastern manufacturer of oil country equipment: Small machine shop, 2,500 to 5,000 sq. ft. floor space. Machine tolerances required .010". Write Box E-588, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED
EXECUTIVE AIRPLANE

Lockheed Lodestar, Ventura PV-1 or DC-3. Prefer well maintained plane direct from Corporation or owner. Supply complete information.

Box E-590
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

FOR SALE—MAPS

PERMIAN BASIN DEVELOPMENT MAP of West Texas and Southeast New Mexico. Scale 1"—64,000'. Pools discovered prior to 1951 in blue. 1951 discoveries and extensions in red. Price $2.50 per copy. Midland Map Company, Box 1211, Midland, Texas.

BUSINESS OPPORTUNITIES

ORGANIZATION now serving as manufacturers representatives seeking additional quality lines for oil field and industrial trade in Oklahoma, Kansas, and Texas. P. O. Box 1201, Tulsa, Oklahoma.

LONG established small but effective organization in California oil industry desires additional line of equipment preferably in engine or other machinery field. Can function as manufacturer's representatives or dealers. Box E-598, The Oil and Gas Journal, Tulsa, Oklahoma.

WANT
N. Y. EXPORT REPRESENTATION?

Long established and well known oil well equipment manufacturer who has maintained N. Y. export office and sales personnel for many years, is now in a position to handle additional representation in New York for high quality manufacturers of oil equipment items. If you're looking for increased export business, write for further information. All replies held in strict confidence.

Box E-359, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

GAS OPERATIONS MANAGER

Graduate Engineer with broad experience in Natural Gas transmission and distribution. Company in Ontario, Canada, has natural gas production and distribution to 75,000 meters over a wide area divided into four districts, with substantial growth prospects. Position requires ability to direct all phases of operations through experienced supervisors, to initiate training programs, handle employee relations, make special studies relating to new transmission and distribution lines, gas utilization, etc. This is one of the top executive positions in the company and should be attractive to a man about 40 years of age, of good character, and looking for an opportunity to justify an assured future. Applications will be treated as confidential in first instance and should give fullest particulars of of technical qualifications, experience in previous positions, usual personal particulars as to age, etc., and approximate salary expected. References will be required later. Apply to Box E-591, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES Engineer needed by prominent Mid-Continent area oilfield engine distributor. Must have actual experience in drilling engine applications and sales promotion. Excellent opportunity for qualified man. Reply will be held confidential; write to box E-585, The Oil and Gas Journal, Tulsa, Oklahoma, giving full particulars of experience, education, etc.

WANTED BY PROGRESSIVE INDEPENDENT

Aggressive, experienced water flood engineer. Must be capable of evaluating reservoirs for flooding, and actually conducting flood operations. Attractive salary plus an incentive for the right individual. Give full details first reply which will be treated confidentially. Box E-589, The Oil and Gas Journal, Tulsa, Oklahoma.

MEDIUM SIZED independent oil company has openings for the following, with salaries above the industry level for such positions:

1. **FIELD MANAGER** to supervise all phases of a unit operation and pressure maintenance project. Prefer man 35-40 years old with technical training. Must have experience in all phases of unit operation.
2. **ACCOUNTANT** to supervise and prepare accounting records, including production accounting, gas and oil measurement records in field office.
3. **FIELD ENGINEER** for unit operations. Prefer petroleum engineer with 2-5 years field experience.

All applicants to any of the above are requested to give briefly their educational and professional background, as well as any military service and present military status. Interviews will be arranged for those having desired qualifications. All inquiries will be considered confidential.

Reply to Box E-595, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

HELP WANTED—Drilling Superintendent for Oklahoma operations. Experienced in Emsco equipment; also knowledge of production and well completions. Call 3-2331, Oklahoma City, Oklahoma.

DRILLERS experienced in operation of Failing, Mayhew, and similar portable equipment, for exploration work in Persian Gulf area. One year contract. Top wages. Living furnished. Give full details of experience in reply to American Independent Oil Company, 111 Sutter Street, San Francisco.

REFINERY MANAGEMENT and supervisory openings with independent refiner and chemical plant. These include Superintendent, Chief Engineer, Operating Supervisor and Process Engineer with good initial pay and the unlimited future of expanding small organization. Box E-565, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER

AA-A1 National Manufacturer has an opening for a Chemical Engineer experienced in all phases of Petroleum production and refining to do part sales, part development work on Chemical cleaning and processing compounds for the petroleum and synthetic rubber industry. Excellent opportunity for advancement—better than average earning. Write age, detailed experience, etc. to:

Box E-587
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

RESEARCH SEISMIC PARTY CHIEF

Major company desires man of exceptional training and experience in field of research seismic operations. Will be expected to operate equipment and supervise field personnel. Degree or equivalent experience essential. Excellent salary and other employee benefits for right man. Reply by letter only to:

Sinclair Research Laboratories, Inc.

Box 3157

Whittier Station, Tulsa, Oklahoma

VENEZUELA

Oil Well Engineer. Experience in well perforating desirable. Good salary and liberal living allowance. Company house provided. Single or married. No children. Give full details on experience and education.

References required.

Box E-596, The Oil and Gas Journal, Tulsa, Oklahoma

PETROLEUM SERVICE ENGINEER

Manufacturer of refinery maintenance and reconditioning materials has an opening for a Petroleum Chemist, General Foreman, or Maintenance Supervisor for technical service to the petroleum industry.

The position will entail considerable traveling, primarily in the West Coast area, doing field work with local representatives assisting them with their sales and product application in petroleum industries.

Applicants must be 30 to 40 years of age, know chemical and mechanical processes and equipment and have experience in operating or refinery engineering.

Reply giving full details of education, experience and personal status to

F. B. Johnston, Box O.&G.J.#1, 117 Liberty St., Room 801, New York 6, New York

HELP WANTED

ADMINISTRATIVE and field sales personnel. Engineering education and/or background necessary. Knowledge of petroleum and chemical industries desirable. Apply: The J. B. Beaird Company, Inc., P.O. Box 1115, Shreveport, Louisiana.

PETROLEUM Industry jobs, Rocky Mountain Area. Need engineers, geologists, draftsmen, field men, etc., experienced and starters. Professional Placement Service, 516 University Bldg., Denver, Colo.

OIL INDUSTRY Employment Service, 405 Tuloma Building, Tulsa, Okla. 4-5974, Tom Robinson, owner. For technical and trained oil industry personnel. No fees.

AGGRESSIVE independent oil company wants subsurface geologist with 3 to 5 years experience in subsurface mapping in North or West Texas area. Give full details of past employment, educational background and salary expected. Replies confidential. Box E-586, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Chemical, Process, or Refining Engineer for plant control work in major Oklahoma Refinery. Catalytic cracking and alkalization experience preferred. Shift work required. Supervisory ability essential. State qualifications and salary expected. Write Personnel Department, P.O. Box 381, Tulsa, Oklahoma.

SITUATIONS WANTED

PETROLEUM ENGINEER, age 36. Major company experience in drilling, production, and reservoir mechanics. Available for position involving the securing of drilling contracts, working up drilling deals, buying or selling leases and royalties or to enter consulting practice. Box E-605, The Oil and Gas Journal, Tulsa, Oklahoma.

POSITION WANTED: Mud Engineer, 5 years experience West Texas, West Central Texas and familiar in North Texas and Oklahoma. Presently employed but would make change in favor of oil company or wholesale distributor. Foreign or domestic. Write Box E-603, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, MS degree mechanical engineering, five years experience, 1½ in production with major, desire production engineer's position with aggressive company in Rocky Mountain area. Box E-597, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER. Age 33. Ten years drilling and production experience in Gulf Coast and Rocky Mountain areas with major oil company. Desires position with independent company. Rocky Mountain area preferred. Box E-600, The Oil and Gas Journal, Tulsa, Oklahoma.

SENIOR Process Engineer with 6 years petroleum refinery and petrochemical experience desires tough job with future. Box E-602, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MANAGER, extensive experience, desires connection with independent company. Box E-601, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

GRADUATE Mechanical Engineer with 11 years experience in production, drilling and workover operations desires to change positions. Also 3 yrs. pipe line construction and operation in army. Now employed in South America. Box E-574, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM Geologist, 11 years experience subsurface, surface, seismic; 32, unmarried; desires return Rocky Mountain Region permanent basis. Box E-579, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL Engineer—Business Admin. Age 40, Refining processes sales and service experience. Desire position with West Coast or Gulf Coast refinery, engineering or financial organization. Box E-585, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

HIGHLY experienced oil company executive capable of assuming complete charge of operations of producing company, or will operate individual properties, West Texas area. Box E-592, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

OVER 2,500 acres leases, Margaret Tollett, Thomas Brooks Survey, Rains County, Texas. Important wildcat producer recently completed this county. Acreage reasonable. Write Roy Morgan, Personal, P. O. Box 1748, Atlanta 1, Georgia.

HAVE over twenty thousand acres leases along Missouri River on North Dakota-South Dakota line. All ten year leases ten cent rentals. Interested in selling shooting option with right of selection. If interested write Box 107, El Dorado, Arkansas.

CAPITAL immediately available for geologically attractive Drilling Deals, Oil Producing Properties, Producing and Non-Producing Royalties. Send full particulars. Box E-434, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE 1500 Acres in Vermillion Basin, no charge, near Platte, pipe line now being built. Magnetometer tests show 3 pools here, 120 ft. oil sand at 1800 to 2900 ft., must drill. H. T. Harper, Vermillion, Kans.

DRILLING Contractor has two secondary recovery leases in Eastern Kansas. Core and laboratory analysis on both showing commercial possibilities. Will sell ⅜ lease on 160A and 13/16 lease on 220A together with equipment on site to developer for $17,500.00 cash and 1/16 override. Reply Box E-582, The Oil and Gas Journal, Tulsa, Oklahoma.

HAVE 50 acres ¼ mile from new discovery of oil wells South East Texas. Will sell 1/16 Royalty for $1000.00 Per Acre. Write John E. Gore, 409 Platt St., Toledo, Ohio.

HUGOTON Embayment and Anadarko Basin Leases & Royalties, Western Oklahoma and Southwest Kansas Areas. John P. Mathis, P. O. Box 1106, Amarillo, Texas.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6835 Delmar Ave., St. Louis 5, Mo.

NORTHWESTERN NORTH DAKOTA LEASES AND MINERALS

Our latest lists with prices, mailed on request. Will also buy acreage where you want it. Any place in Northwestern North Dakota. References exchanged.

BORSTAD & FITZMAURICE
Oil Properties
4th Floor 1st National Bank Bldg.
Phone 40-226 Minot, North Dakota

FOR SALE
OIL PAYMENTS

$500,000.00 worth of oil payments payable out of 1/16th of 7/8ths in major oil companies undeveloped (wildcat) long-term leases in scattered West Texas Counties for

$30,000

or half of deal for

$15,000

For complete information write

Box E-577
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

$50,000.00 WANTED for shallow production development with new process, faster, cheaper than water, greater recovery, control valuable patent technique, tremendous opportunity. Box E-604, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Two hundred acre lease surrounded by major company holdings and development, Shelby County, Texas. $3 per acre. C. A. Parker, Office Polley Hotel, Center, Texas.

INVESTMENT funds wanted—From excess taxpayers by independent oil operator. For exploratory well drilling immediately. Geologically favorable. Illinois basin. Box E-569, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1238, Great Falls, Montana.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationary Company, 115 South Cincinnati, Tulsa, Oklahoma.

SERVICES

ASSOCIATED OIL CONSULTANTS
Property Valuation Reserves Estimates
Reservoir Analysis
Production Problems
1115 Kenwood Houston 6, Texas

B. & W. Names Hub Supply Southern Representative

B. & W., Inc., has announced the appointment of Hub Supply Co. (Pop Lewis and Nick Reeves) of Shreveport as sales and service representatives for B. & W. products. They will serve the East Texas, North Louisiana, and Arkansas areas.

Hub Supply will maintain warehouse stocks of B. & W. Latch-On centralizers with Ken-Kave bows, Multi-Flex scratchers, hinged Nu-Coil scratchers, rotating scratchers, and wall-cleaning guides. Hub will also provide field service to assist in the installation of the equipment on the casing and during the entire cementing operation.

Chicago Bridge Transfers Goldsby to Export Division

Fred L. Goldsby has succeeded W. D. Robinson, who retired on December 31, 1951, in Chicago Bridge & Iron Co.'s export department in New York City.

Goldsby started with Chicago Bridge in 1927 and successively held positions in its Chicago shop, operating department, drafting room, research and development department, assistant to chief engineer, and has been in charge of the company's foreign erection department at New York since September 1947.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre, as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p. m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file a showing of citizenship and interests similar to that required under 43 CFR 192.42(e) (4) and (f) Circular 1782. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 1860, Title 18, U. S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1 per acre. The lands are in the known geologic structure of the Fenton field, New Mexico, and are offered in one parcel described as follows: T. 21 S., R. 28 E., N.M.P.M., sec. 15, S½NW¼, N½SW¼, 160 acres. Bids must be submitted on or before 1 p.m., E.S.T., March 19, 1952. With reference to the bond requirement, if the successful bidder has an approved full nation-wide bond in the amount of $150,000, or an approved nation-wide bond covering public domain lands for the State of New Mexico, no additional bond will be required. Marion Clawson, Director.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre, as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p. m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file a showing of citizenship and interests similar to that required under 43 CFR 192.42(e) (4) and (f) Circular 1782. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 1860, Title 18, U.S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The lands are in the known geologic structure of the Monument-Jal field, N.M.P.M., New Mexico, and are offered in the following parcels: Parcel No. 1: T. 23 S., R. 34 E., Sec. 20, SW¼, 160 acres. Parcel No. 2: T. 20 S., R. 36 E., Sec. 25, NW¼, 160 acres. Parcel No. 3: T. 23 S., R. 36 E., Sec. 17, SW¼, 160 acres. Parcel No. 4: T. 24 S., R. 36 E., Sec. 27, SE¼SW¼, SW¼SE¼, 80 acres. Total 560 acres. Bids must be submitted on or before 1 p. m., E.S.T., March 19, 1952, and must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. With reference to the bond requirement, if the successful bidder has an approved full nation-wide bond in the amount of $150,000, or an approved nation-wide bond covering public domain lands for the State of New Mexico, no additional bond will be required. Marion Clawson, Director.

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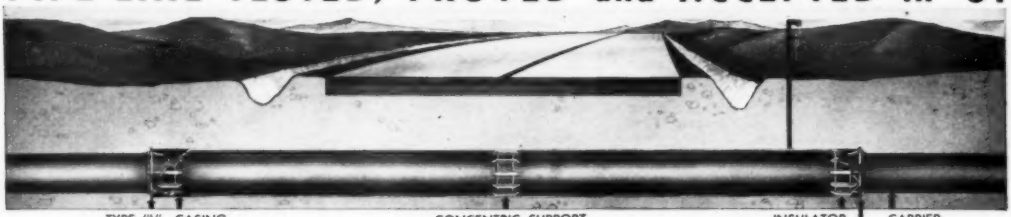
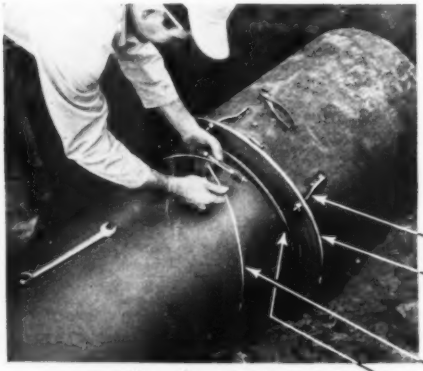
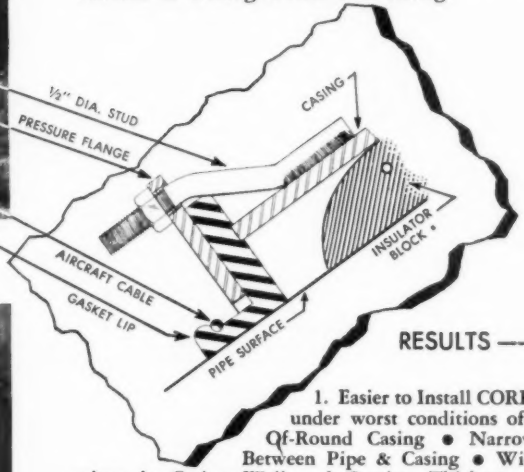




Assembling cable with rubber-covered union for clamping gasket lip to pipe.

TYPE "L" WmSEAL CASING BUSHING*

A New Design: It BUTTS Against End of Casing Instead of Fitting Inside the Casing.



THE COMPLETED INSTALLATION
Note that galvanized cable and union are insulated from pressure flange and from pipe.

RESULTS ——

1. Easier to Install CORRECTLY under worst conditions of • Out-Of-Round Casing • Narrow Space Between Pipe & Casing • Wide Variations in Casing Wall and Coating Thickness • Mud • Casing ends beveled — by machine or hand torch.

2. WATER-TIGHT Seal with "L" gasket . . . . . .
   - BUTTED AGAINST CASING as pressure flange is tightened on ½" studs welded to casing.
   - TIGHT TO THE PIPE as aircraft cable (4,600# tensile) is tightened to gasket lip. Union is rubber covered to INSULATE galvanized cable assembly from bare casing structure.

3. Always Insulated from the pipe line when a Concentric-Support Insulator is installed just inside casing after the "drag section" is in place.

AS STRONG & DEPENDABLE AS THE MEN WHO INSTALL THEM

REPRESENTATIVES

Stuart Steel Protection Corp., Kenilworth, New Jersey | H. E. Davis, Los Angeles 15, Calif. | James S. Kone Co., Amarillo, Texas | Keyes Tank Co., Provo, Utah | Keyes Tank & Supply Co., Casper, Wyoming | Canadian Equipment Sales & Service Co., Ltd., Edmonton, Calgary, Toronto, Canada

WRITE FOR COMPLETE INFORMATION

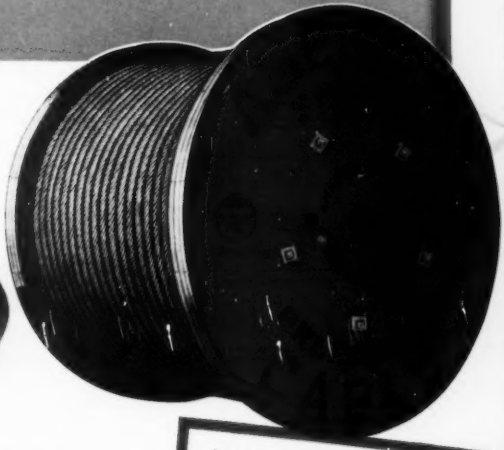
*Patent Pending

THE PIG WITH THE POKE CLEANS PIPE LINES

T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

TRU-LAY
Preformed
WIRE ROPE

It handles easier—it's safer to use. It performs better and it lasts longer, too. This means fewer changeovers. Men who use it seldom switch. If you haven't tried TRU-LAY do so on your next job.



ACCO

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

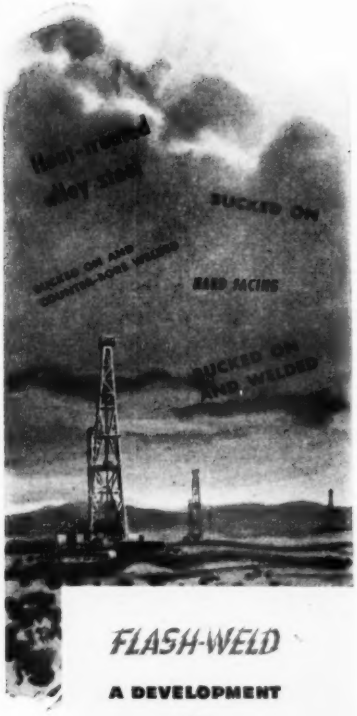
AMERICAN CHAIN & CABLE
AMERICAN CABLE DIVISION

TRADE MARK

In Business for Your Safety

ALSO MAKERS OF THE COMPLETE LINE OF
Registered
WIRE ROPE SLINGS

Where Do Tool Joint Developments Come From?



Check the records and you'll find that the men who develop rock bits also are responsible for virtually every major improvement in tool joint design.

It's easy to understand why!

Every factor determining the speed and economy of making hole is a concern of Hughes rock bit engineers and field men.

Here's the record of Hughes' developments:

1. First fully heat-treated alloy steel tool joint ...making use of tool joints economically feasible.
2. First tool joint bucked on with controlled torque to prevent galling of pipe threads and washouts.
3. First bucked on and welded tool joint to prevent last engaged thread failures.
4. First bucked on and counter-bore welded tool joint to reduce installation costs.
5. First unitized drill stem—the welding of tool joints and pipe by the Hughes FLASH-WELD process.
6. First hard facing in depth to lengthen life of tool joints.

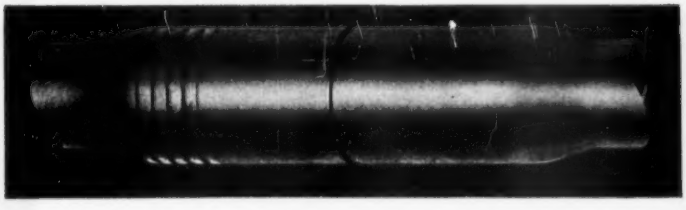
Each Hughes tool joint development can be traced directly to intimate day-to-day contact with the problem of keeping drilling speeds up and costs down.

FLASH-WELD

A DEVELOPMENT

OF

HUGHES

TOOL COMPANY

HOUSTON, TEXAS